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- \* Programming assistance during development of a graphics editing system for producing printed circuit artworks. This will use storage tube terminals over time sharing.
- \* Support of programs for tape control of NC metal cutting machines. This involves post-processor writing and implementation of new NC programs currently under development within Philips.

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control are BASIC and FORTRAN. Two years FORTRAN experience is necessary and experience of working with large programs, data structures, or NC would be an advantage.

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# COMPUTER WEEKLY International

NUMBER 76

THURSDAY, SEPTEMBER 8, 1977

## Germans set up £1m plant in Ireland

COMPUTER and microelectronics company Lewicki Mikroelektronik of Ulm, West Germany, which makes hybrid integrated circuits, is to establish a £1 million plant at Tullamore, Irish Republic. Other companies which have plants planned or established in Ireland include Nippon Electric of Japan, DEC, Dataproducts, Amdahl

and Centronics of the US and Nixdorf Computer of West Germany.

Exports of electronic goods from the Republic increased sixfold between 1973 and 1976 as a result of the generous tax advantages offered by the Irish government to companies establishing manufacturing facilities in the country.

## Three US firms in satcom trials

THE provision of a comprehensive internal communications service for large corporations is currently being tested by three US companies in conjunction with Satellite Business Systems, which is part owned by IBM.

The three companies involved in the experiment, called Project Prelude, are space and aeronautical specialists Rockwell, the Texaco oil company, and the stores group Montgomery Ward.

Each company is exchanging data between two distant sites, with small portable earth stations being used at each of the six experimental sites.

The long-term objective of SBS is to provide a total information service to companies.

"SBS will offer high-speed facsimile for correspondence

and document distribution, various types of video for teleconferencing as a partial substitute for business travel, plus advance data processing-related applications," Philip Whitaker, president of SBS, told Computer Weekly. The earth stations used in Project Prelude are being built by communications satellite specialists Comsat, which owns SBS in a joint venture with IBM and Aetna Life.

The use of roof-top earth stations will completely isolate users of the satellite from the conventional terrestrial telephone network, which is provided in the US primarily by AT&T.

Rockwell will transmit data between Pittsburgh and Seal Beach, California, Texaco between Harrison, New York and Belaire, Texas, and stores group Montgomery Ward between

Chicago and Catonsville, Maryland.

The satellite to be used for Project Prelude is the Communications Technology Satellite, jointly owned by NASA and the Canadian government. It will enable the experiments to be carried out in the 12 to 14 GHz frequency band rather than the widely-used 4 to 6 GHz band which is already becoming congested.

The SBS satellite will be able to handle traffic at up to 6.3 Megabauds per channel. It will have a power output of 20 watts and a total capacity of 43 Megabauds, multiplexing computer, telephone and image transmissions into a single beam.

Communications controllers at the earth stations will monitor the amount of transmission time needed.

## Norwegian mini update

A NEW version of Norsk Data's powerful scientific minicomputer, the Nord-10, has been announced.

The Norwegian minicomputer, called the Nord-10/S, has a modular, flexible design enabling single and multiprocessor configurations to be assembled, with facilities for main memory to be shared by up to four processors.

The main MOS memory has an access time of 450 nanoseconds and expands from a basic 32K 18-bit words up to 256K words. Speed of operation can be enhanced by use of an optional 1K-word cache memory.

The memories are multi-ported, allowing independent data transfer to and from the discs via separate high-speed channels. Total disc capacity is 792 Megabytes.

The Nord-10/S runs under the multilingual multi-mode Sitrans III virtual storage operating system. Languages offered include Fortran V Basic, Cobol and RPG II. The Sitrans database system, designed by Shipping Research Services of Oslo, is also on offer.

Other languages on Nord-10 minis include Coral 68, Pascal, Nodal, Simula and RCPL.

## Portable system from IBM

US SOURCES say IBM is preparing a new portable computer larger than the 5100 and using floppy disc storage rather than the special tape cartridges on the 5100. Applications software packages are likely to be offered with the new machine. Olivetti has announced that in the opposite direction, introducing a P8040 which slots in below its P8080 minicomputer.

## Threats from India, Nigeria

THE protracted trial of strength between IBM and the Indian and Nigerian governments over national equity participation in the local companies has flared up again. Although the governments of both countries have periodically threatened to close down the IBM operations if they do not

comply with their equity participation rules (CW, June 8, 1974), they have always previously backed down.

The new Janata government in India is more pro-business than its Congress predecessor, and therefore likely to reach a compromise with IBM.

## Australian trade law change

CONSUMER legislation which was interpreted by most computer companies in Australia as binding them to unlimited liability, is likely to be amended following intense lobbying of the government.

The Trade Practices Act came into effect on July 1, and most of the mainframe manufacturers apart from ICL promptly stopped signing contracts with potential customers, although all have continued marketing and

accepting letters of intent.

The companies interpreted the Act to mean that any company supplying goods worth up to \$15,000 could not limit its liability as to the consequences of its use of those goods or services.

Although most computer systems cost more than \$15,000, the companies believe that by isolating parts of a system into units below that value, customers could theoretically take

action against their supplier for almost anything even indirectly linked with the operation of the computer.

The Minister for Business and Consumer Affairs in the Liberal-Country Party government, Mr Wal Fife, has now said that significant amendments to the Act may be introduced. His amendments would enable parties to commercial transactions to limit their liability "provided that the limitation was fair."

The same problems arising with other systems.

Fife said the "Ombudsmen" were working with the Consumers' Association, which received the complaints, had one attempt at solving them, then passed them on.

A team of 14 volunteers are serving as "Ombudsmen" in Toronto, and they deal with about six complaints a month. Fife said most problems concerned billing and subscriptions. He added that the low number of complaints suggested that systems were operating better than had been thought.



## Soviets order Seecheck

AN important international marketing breakthrough has been achieved by Redifon Computers with the announcement of the first Russian orders for its Seecheck key-to-disc system.

The first two customers are Moymyassprom, the organisation that handles meat processing and distribution in Moscow, and the Voronezh steel works located 500 kilometres south east of Moscow.

The equipment being supplied to

them will include a Cyrillic alphabet terminal which has been produced by Redifon specially for its Russian customers. The software for the terminal was developed by Redifon programmer Cheryl Houlind (pictured above), and can handle 128 characters for input and output code translation.

Redifon is already a well established systems supplier in Poland (CWI, January 13) and Czechoslovakia (CWI, June 9).

## Fujitsu gives details of network architecture

DETAILS of Japanese market leader Fujitsu's network architecture have now been released. Called FNA, the architecture has been designed to separate data communication functions from data processing functions within each element of the network, reducing the load on the host mainframes and minimising line and programming costs.

The ISO HDLC data link control standard is used, and the X25 packet-switching interface and other recommendations of both ISO and CCITT are incorporated.

Four different communication processors of varying power and complexity are offered, and FNA is designed to support mainframes from the M series, and Facom 230-5 and 230-8 series.

Although multiple sub-hosts can be supported by FNA, it appears that overall control of the network is normally vested in a single host.

PROCESS control equipment from the Foxboro company is to be sold in Korea by a new company, Hansaeng Foxboro of Seoul, owned jointly by Foxboro and the Korea Silk Co.

● Stocks slump on Wall Street - page 38.

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کتابخانه



# Tim Palmer presents a preview of this month's Sicob points the way to a computerised office

ONE of the main themes of the 28th Sicob Exhibition, which opens in Paris on Wednesday, September 28, and runs into Friday, September 30, will be computers in the office. Nearly all the leading manufacturers will be showing new or enhanced systems aimed at the further automation of commercial routines, and at providing closer links to mainframes and network services.

After two years of relative stability and progress, large question marks again stand over the future of the French industry, and of CII-HB in particular.

And there have been changes at the Industry Ministry, with Michel d'Ornano, overlord for three years, making way for René Monory who will officiate at the opening of Sicob for the first time.

CII-HB is still completing its plans for Sicob, but the theme of the display will be data processing in the village. The stand will be laid out as a village, with bank, post office, stores etc, each housing a separate demonstration of interactive computing in practice. The demonstrations will run mainly on remote Level 64 machines, but there will be several Level 6 minicomputers, recently introduced in France, on the stand.

Burroughs will emphasise the benefits of its newly integrated low-end series of computers, which allows the user to upgrade from the small B80 office computer through the B800 to the B1800 small mainframe, all without having to make any major alterations to his software.

Something for everybody in the office environment is provided by IBM in Paris. The 3750 telephone switching system, made in France, will have its annual Sicob outing, and the competitive System 34 workstation-oriented small business system will make its French exhibition debut. The System 34 has proved so popular that the nine-month delivery delay quoted when the machine was introduced in April has slipped to nearer 18 months.

The 34 will be shown alongside the better-known System

32, and IBM will also again highlight the compact and versatile 5100 portable computer, programmable in APL and Basic and using a specially-designed tape cartridge as the storage medium.

New since last year is the IBM office System 6 series of word processors. Although it looks like a computer, the machine is in fact a hard-wired non-programmable device.

Three versions of the System 6 are on offer. The 6/430 includes a six-line display, magnetic card reader and floppy disc drive. The 6/440 adds an ink-jet printer to the basic configuration, and the 6/450 includes communication facilities. These allow it to communicate either with another System 6 or with a mainframe computer.

After two years' absence following the collapse of the Unidata consortium with CII and Philips, Siemens returns to Sicob with a challenger to the IBM word processor.

Siemens' offering, which first appeared at Hanover, is called the Textsystem 580. It is controlled by an Intel 8080 micro, includes up to 64K-bytes of main memory, has a full 1920-character display and supports one or two floppy disc units.

A strong line-up of new products will make the stand of Olivetti, standard bearer of the Italian computer industry, well worth a visit.

Headlining Olivetti's display will be a new portable computer which slots in below the P6000. Called the P6040, it is still programmed in Basic, and comes with 2K-bytes of memory, half of which is available to the user. A further 2K-bytes can be added, and there is also a tiny integral mini-floppy disc drive. The disc is 6.5cm, 2.5in in diameter, and carries 3K-bytes of programs and data.

The P6040 incorporates a 16-character strip display for operator guidance, and a 30cps matrix printer. Up to eight peripherals including fast printers, secondary storage and plotters can be attached, and Olivetti believes that the 6040 will be particularly attractive to engineers.

Already shown at Hanover, and now available in most European markets, the Olivetti TC 480 printer terminal will also feature prominently.

Data entry can be via the traditional paper tape, or from magnetic tape cassette or 80K-byte mini-floppy disc. The user has up to 8K-bytes of memory at his disposal, and the TC 480 is the successor to the widely used TC 300.

A third new item from Olivetti, and a vital product for

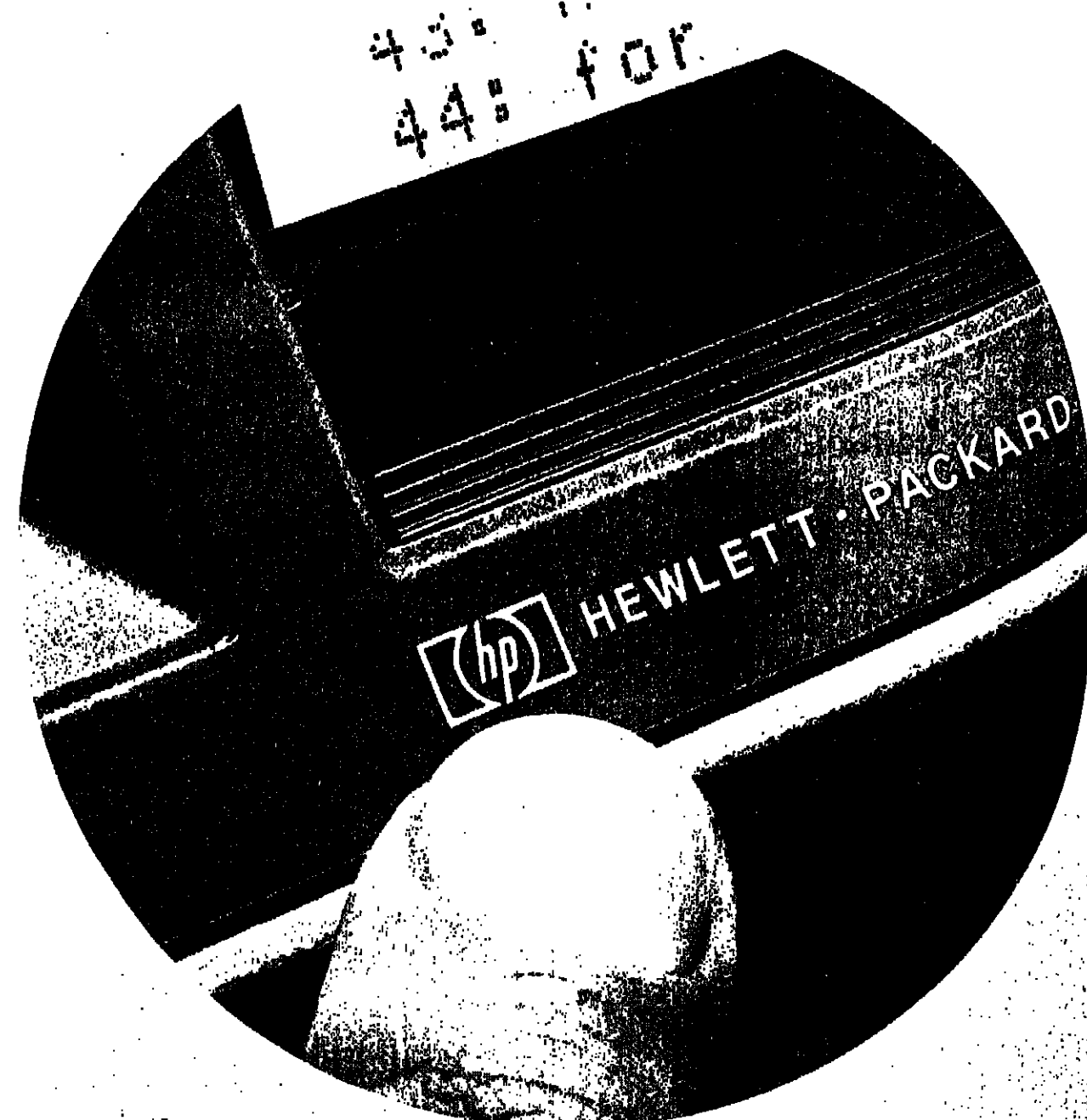
the company, is the DE 700 series of display terminals. The significance of the line is that it will succeed the DE 500, which Olivetti marketed on behalf of Sycor of the US.

Olivetti decided not to market the Sycor 440, and instead designed the DE 700 line in-house. Sicob will provide an opportunity to compare the two products, as the Sycor 440 will appear on the CMC stand.

●Continued on Page 31



No excuse is needed to present another angle on the delightful young lady who first introduced the Olivetti TC 480 printer terminal to CII readers in May. The TC 480 succeeds the TC 300, and has already found favour with Norwegian State Railways. The user gets up to 8K-bytes of memory and wide choice of data entry attachments.



## The international sign for desk-top computing

All over the world Hewlett-Packard desk-top computing systems are saving time, trouble and expense for tens of thousands of scientists and engineers, administrators and businessmen. Proven technology, state-of-the-art N-MOS and LSI techniques, simplified interfacing, and systems and software know-how, add up to cost-effective performance, complete flexibility and reliability.

# exhibition in Paris European unveiling of latest products

●From Page 30

The new Olivetti line includes six models, ranging from the desk-top DE 170, which has a 280-character display, through to the DE 760, which includes two keyboards and two 1920-character visual displays, and is built into a desk.

The DE 700 series terminals use floppy discs for secondary storage, and include a multi-

programming operating system. Two proprietary programming languages, Field Definition Table for establishing formats, and Field Processing Language for data entry control, are offered.

Perhaps the most comprehensive challenge so far to IBM's Systems Network Architecture portfolio of products is now being introduced by ITT subsidiaries throughout Europe. Potential UK users have to

wait until the beginning of October for full details, but can get a sneak preview at Sicob, where ITT's CGCT subsidiary will be offering the products, which are brought together under the name CNA, Communications Network Architecture. Non-French visitors should bear in mind that the CNA announcements differ from country to country. Cornerstone of CNA are two communications processors,

The office of tomorrow — IBM version. This is the 6/450 configuration of the System 6 word-processing system. It includes the ink-jet printer on the right beside the central control console with keyboard and floppy disc drives. One the left are two off-line keyboard units feeding data on to floppy disc for output on the jet printer.

originating from ComTen of Minneapolis. Called the 3805 and 3807, they can communicate simultaneously with two and four mainframes respectively. The 3805 goes up to 256K-bytes and 128 lines, and the 3807 to 512K-bytes and 256 lines. The 3830 is a multi-function

terminal system for data capture and preparation and remote job entry.

The 3230 is a new multi-modal display terminal, and there are several new models in the 3280 line.

The 3780, which is not planned for introduction in the UK, is a display terminal system including line printer and badge reader, and compatible with Honeywell's VIP 7700 and 7780 systems.

The 3470 is ITT's alternative to IBM's 3740 key-to-floppy-disc system.

Although the CNA products are aimed primarily at IBM users, and will be demonstrated in an IBM environment at Sicob, compatibility with most of the other mainframe manufacturer's systems is offered.

On the telecommunications side, CGCT will show a new microprocessor-controlled PABX, the Unimat 4040. Little brother of the 4080, and controlled by one or more Intel 8080 micros, the 4040 takes up to 16 exchange lines and 64 extensions, and offers most of the abbreviated dialling and other features made possible by software control.

The 4080 is offered in the UK, but the 4040 is barred by the rule that the Post Office has a monopoly of all PABX equipment of under 100 lines.

Two models in the DECdata-system 320 line, the 322 and 324, appear for the first time at Sicob. Both are built around the LSI-11 microcomputer, with a main memory expandable from 32 to 56K-bytes. The 322 is a floppy-disc backed system, taking up to four 256K-byte drives, and the 324 uses fixed and removable disc storage to a maximum 20K-bytes in addition to a dual floppy drive.

Both support up to four VDUs of hard-copy devices, and they are programmed in DIBOL, the DEC business-oriented language.

Also new to Sicob is the LS120 DECwriter III teleprinter, which runs at 180cps using a 7x7 dot matrix.

Centronics is diversifying into non-impact printers, and the Micro I, first shown at NCC in Dallas, will make its European debut. A small electrical discharge printer, the Micro I uses special paper and runs at up to 3,000cps. Attractions are its size, speed and low noise.

Centronics will also offer the 761 teleprinter, which includes APL character set, and the complete 700 and 8000 lines of printers.

Data General Nova minis turn up in increasing numbers in small business systems, and Mini-Computer Systems will be showing the Micros II for the first time in France. Micros II is built around a Nova 3 mini, and comes with a basic 16K-words of main memory, five Megabytes of fixed and five Megabytes of exchangeable disc storage, 1820-character display and 60cps printer.

The multiprocessing operating system allows foreground and background working, and the basic Micros II costs 172,000 francs, about £28,000.

There will be plenty on offer from Data 100 Corp, including the Keybatch key-to-disc system, with up to 16 keystations, 10 Megabytes on disc, and magnetic tape facilities. The company will show the Model 77 key-to-floppy disc system which takes up to three floppy drives and two keystations. Communication to a mainframe is offered at up to 9600 baud.

New from Data 100 for the cluster terminal market is the Model 82 display terminal system. The IBM 3270-compatible Model 80 takes up to 1920-character or 32 480-character displays and up to eight printers.

The Model 78 is Data 100's 32K-byte remote batch terminal which supports all common forms of data entry peripherals.

CMS-France is preparing to return to American ownership following takeover talks with Microdata of California, but the company's trading relations in France will remain substantially unchanged, with Microdata's Reality system, marketed elsewhere, by CMC, still being handled by Interchange.

The CMC offerings will include the Sycor 440 cluster terminal system, and the CMC 500 and 1800 key-to-disc systems.

As well as exhibiting under its own name, Siemens will show the Dicom 2012 microfilm recorder, controlled by a Siemens 310 process control mini, on the Hell stand.

Two Cnecomp products make their European debuts at the show. They are the IGT 100 interactive graphics terminal and the 800 series digitiser.

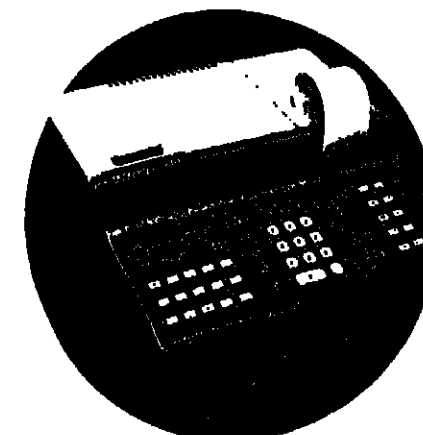
Benson of France claims to have pioneered the concept of Telegraphics, and the company now has a complete range of V24-compatible blynsynchronous interfaces for remote attachment of graphics terminals to IBM and CII mainframes. The company will show selections from its comprehensive on and offline graphics equipment.

The combination of the floppy disc drive and the microprocessor is causing a revolution in the world of office products, and a wealth of systems aimed at specialised markets will be offered at Sicob.

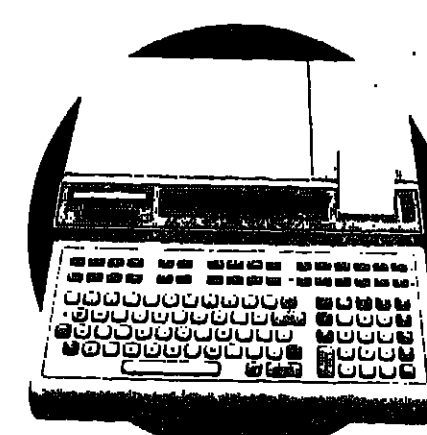
Informatique Provence Services, of Aix-en-Provence, is offering its Signalon accounting machine for solicitors' offices, which looks like a typewriter, but is backed by floppy disc drives, and includes a 32-character strip display.

It can also be used with a disc-backed central processor, capable of supporting up to 20 of the typewriters, as well as visual display terminals. A wide range of accounting and legal applications, including the drawing up and editing of contracts, and file access and maintenance are possible with the Signalon system.

Another floppy-backed typewriter is the 6610 from Facit-Addo of Sweden, which allows frequently-used paragraphs to be stored. The Facit 6650 desk-top accounting machine will also be shown.



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HP 9831. 8K-32K byte internal memory. Built-in 250K byte bi-directional search high-speed data cartridge. Special keys access up to 34 pre-recorded programs with one or two keystrokes. Programmed in powerful, easy-to-learn BASIC.

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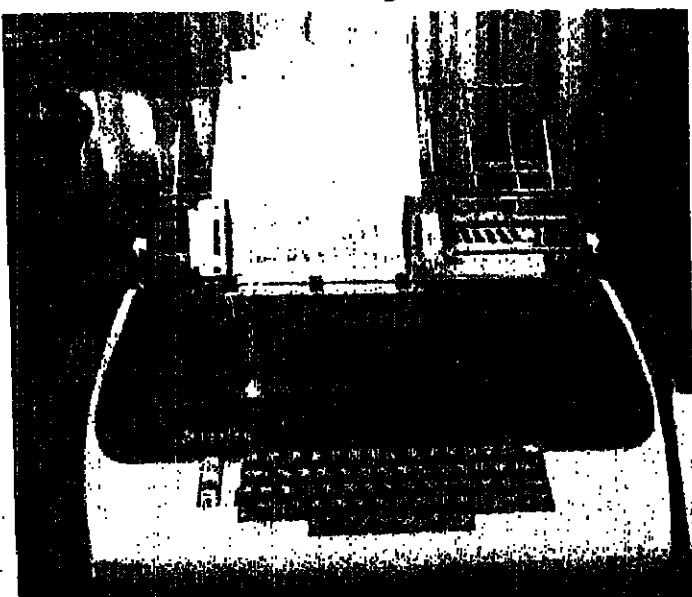
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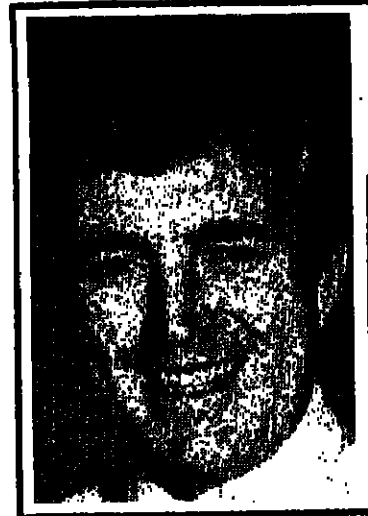
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A challenging piece of engineering design by a small French company, Informatique Provence Services, has resulted in a modular and comprehensive automation system for offices and schools. The basic floppy-disc based system can be expanded to a multi-terminal system with full accounting facilities.





The accelerating merger of computer, communications and semiconductor technologies heralds the arrival of the "Information Age", writes MORRIS EDWARDS (pictured left). But he says that, while their destinations

may be the same, the routes by which Britain and the US will travel to this new era look like being markedly distinct. Edwards is a Boston-based data communications consultant, and has more than 16 years' experience

in telecommunications both in the US and in his native England. Recently he was editor of the Datacomm User Magazine, and programme chairman of the annual Datacom conference and exposition.

# Heralding the Information Age

IN the United States, as in Britain, the accelerating merger of computer, communications and semiconductor technologies is heralding the arrival of the "Information Age." However, while their destinations may be the same, the routes by which Britain and the United States will travel promise to be markedly distinct, reflecting the substantial differences in the governmental, regulatory and industrial makeup of the two countries.

Government in the United States is separated into three departments, one vested with legislative power, one with executive power and the third with judicial power. At the federal level, these departments translate into Congress, the Executive Office of the President, and the Supreme Court, each of which could play a role in developing a national information policy.

When he took office in January, President Carter inherited a report which strongly recommended the formulation of a co-ordinated national information policy. Prepared by the Domestic Council Committee on the Right of Privacy under then

Vice-President Nelson Rockefeller, the report stated that a great number of public policy questions were being generated by advances in computer and communications technology and by citizen demands for "clarification and their rights to have and control information."

Specifically, the report proposed an inter-agency council on information policy with a full-time chairman and high-level representatives from federal agencies. In addition, it recommended an advisory committee with members drawn from the private sector, local government and the academic and professional disciplines concerned with information policy issues.

An office of information policy, established in the Executive branch to advise the President, would prevent information concerns from being compromised, the report stated.

In spite of the report's recommendations, President Carter has proposed disbanding the one agency dealing with information policy in the White House, the Office of Telecommunications Policy (OTP), splitting its functions between the Office of Management and

Budget (OMB) and the Department of Commerce. If Congress takes no action on the proposal by mid-September, the split goes into effect automatically, putting policy matters in the hands of an Assistant Secretary of Commerce for Communications and Information.

Many have expressed concern over the demise of OTP, and Congress is examining what, if any, action should be taken to maintain a strong and visible policy-setting force. Meanwhile, Commerce Secretary Juanita Kreps has reassured critics of the plan that she and President Carter both attach significant importance to communication issues.

In Congress, concern over the OTP reorganisation comes mainly from the Senate and House Subcommittees on Communications. Both groups have been holding hearings to decide whether it is time to update the

Communications Act of 1934 to bring it in line with such technological developments as satellites, hybrid data processing/communications services and microprocessors.

Since a major re-write of the Act would raise critical issues affecting information policy, the subcommittee are naturally apprehensive of any downgrading in the status of OTP.

To provide a technological background to its deliberations, Congress has asked its advisory arm, the Technology Assessment Board to study interacting communications, computer and information policies. Working under a \$75,000 budget, the Board will examine new technologies such as satellites, fibre optics, solid-state devices and advanced switching-multiplexing and digital techniques. It will also look at new services for transportation, electronic mail, electronic funds transfer, financial and business services, health-care delivery, education and aids to the handicapped.

Another Congressional resource is the FCC, which serves not only as the nation's communications watchdog, but also as a repository of expertise in computer/communications issues. Over the past decade, the FCC has continued to break new ground in areas of communications policy and has simultaneously become the most visible federal agency with delegated authority in any area of information resources policy.

It was the FCC's recent policy of favouring competition in communications that ultimately resulted in Congress reviewing the Communications Act of 1934. The FCC's pro-competition policy dates from 1968, when its landmark Carterfone decision ruled that independent (non-AT&T) equipment could be attached to the switched public telephone network. Previously, AT&T had enjoyed a complete monopoly over the supply of such equipment.

For data users, the major benefit of the Carterfone decision was the freedom it gave them to use higher-speed or cheaper versions of the modems offered by AT&T. Over the next few years AT&T's competitive front broadened considerably when the FCC ruled that any "specialised" carrier could offer interstate private-line services simply by demonstrating that it had the required technological and financial muscle.

AT&T claimed that such carriers would "skim the cream" off the lucrative long-haul private-line services, leaving AT&T with the less profitable short-haul business.

AT&T argued that, since its profits from long-haul services subsidised the switched network, loss of that business to the new carriers would force up the telephone bills of home-owners across the country.

Failing to convince the FCC with this argument, AT&T finally took its case "to the public" last year by having bills introduced in Congress effectively to reverse the FCC pro-competition rulings and reinstitute a total communications monopoly.

Known collectively as the Consumer Communications

Reform Act of 1976, the bills would have outlawed the specialised carriers — while allowing AT&T to buy them up with immunity from anti-trust action — and shifted much of the regulation responsibility from the FCC to regulators in the 50 states, where AT&T has more political clout.

Initially, AT&T gained considerable Congressional support for the bill with the populist argument that the FCC was favouring the interests of big business at the expense of the average telephone user.

Opposition forces soon marshalled their resources, however, and thwarted passage of the bill. In the ensuing debates, though, sufficient communications policy issues were raised to convince the House and Senate Subcommittees on Communications that the 43-year Communications Act was due for study, and possible revamping.

Meanwhile, the FCC is undergoing an overhaul of sorts as it wrestles with the complexities of regulating communications in the face of encroaching data processing technology. As early as 1968, the FCC recognised that communications carriers might be tempted to enter the unregulated data processing business and compete unfairly by subsidising their unregulated activities through monopoly revenues.

This concern led to the five-year-long Computer Inquiry study, following which the FCC issued rules governing the distinction between data processing, which it decided not to regulate, and message switching, which it would regulate.

The FCC also developed the concept of "hybrid service," ruling that it would be regulated when the service was more communications than DP and unregulated when DP was dominant.

Under its Inquiry rules, the FCC also required communications carriers to offer hybrid or conventional DP services only through separate corporate entities. AT&T was a special case because of a 1956 consent decree settling an anti-trust suit whereby the carrier agreed to function only as a regulated carrier. Accordingly, the FCC barred AT&T from offering DP services, even through a subsidiary.

Five years after the FCC issued its "final rules" on the distinction between DP and communications, it was forced to re-open its Inquiry because intelligent terminals and distributed processing, among other developments, had made the DP/communications dividing line more difficult to draw.

Under Computer Inquiry II, the FCC proposed to delete the concept of hybrid services and substitute a more positive definition of data processing. However, this move was quickly attacked by industry observers, who claimed that no

natural technical boundary could be drawn between computers and communications, and that the hybrid concept was needed because some offerings required the mixing of DP and communications services to be viable.

In March, the FCC expanded its Inquiry by asking for comment on whether terminals that can be used for either communications or data processing should be regulated on a communications carrier basis at all.

The question was obviously directed at AT&T and its Data-speed 40/4 terminal, which is tariffed as a communications device even though it is functionally similar to — and competitive with — the popular IBM 3270 CRT terminal. If the FCC decides to deregulate such terminals, the issue of AT&T 1956 consent decree looms large since it would prevent the carrier from offering the terminal.

In June, this conflict was touched upon by many of the organisations filing comments in the Inquiry. IBM took to the bull by the horns, suggesting that AT&T be free to offer its equipment and services without regulatory constraints.

IBM proposed that only pure transmission function common carriers be regulated, since this function is the natural monopoly. It suggested that common carriers be allowed to provide all other services on a competitive basis.

Rather than having the carriers offer through separate entities, IBM favours using rigorous accounting system to allocate the cost of regulated and unregulated activities, and suggested modification or cancellation of the 1956 consent decree as a proper way to let AT&T to compete in these areas.

AT&T, meanwhile, argued that broader regulation so that could enhance its communications offerings with data processing functions without violating the consent decree.

Replies to the initial comments in the Inquiry are due September 12, and a ruling could come in early 1978.

In the midst of its deliberations, the FCC is about to appoint a new person at the helm. Chairman Richard E. Wiley's term expires on June 30, and his only holding office until replacement is named. Deputy Chairman Robert E. Kahn, the FCC's top advisor, has been extremely vocal in his communications policy impact on information policy.

Addressing a national conference on computer communications, Wiley stated that: "Computer communications lies right at the heart of mankind's next great advance in economic development."

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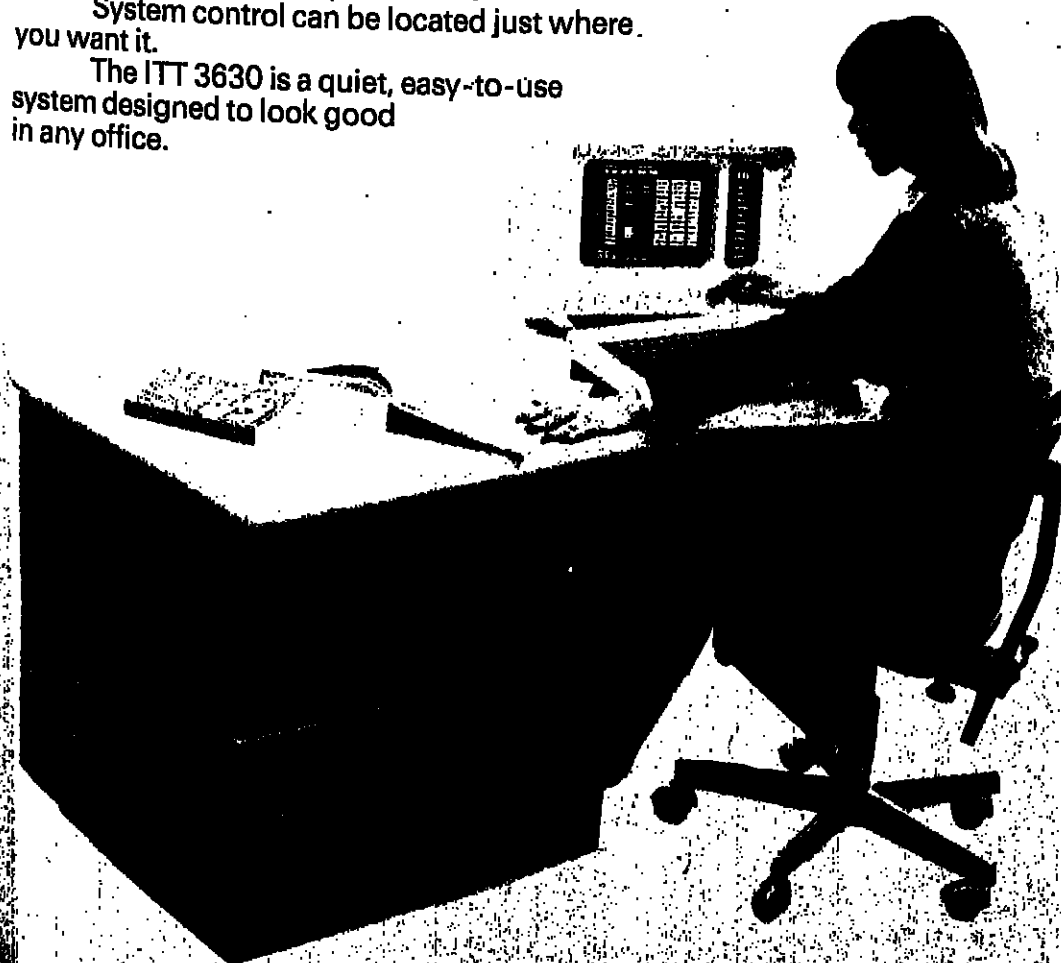
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## MARKETVIEW

FOUR years ago, six European-owned companies still competed against IBM in the medium to large scale general purpose computer market. In order of size they were ICL, Siemens, CII, Philips, DataSAB, and Telefunken Computer.

Today, only the first two survive in that market, though they have been joined by CII-Honeywell Bull which achieved "European" status when its French shareholding was raised from 34% to 53% in July, 1976.

Which of these three will still be around — at least in the general purpose mainframe market — in 1981, four years from now?

This somewhat morose thought is prompted by a little reported talk by Pierre Lepicard, CII-HB's financial director, to a gathering of European financial journalists in Guernsey earlier this year.

After describing the economics of designing, manufacturing and marketing a range of end user systems as wide as IBM's, M Lepicard displayed again the financial model with which Honeywell Bull had previously justified its absorption of the CII DP division, Figure 1.

# Survival plans for the Eighties

According to this, a general purpose systems manufacturer with \$12 billion revenues in 1975 and therefore a 55% share of world DP systems revenues (guess who?) would have been left with 30% of revenue as profit after allocating other parts of the revenue to direct production costs, R&D, marketing, maintenance and administrative overheads.

These costs do not decline pro rata with revenue, so that the smaller a manufacturer's share of the world market, the smaller too will be the profit. But this might still be a healthy 15% for a manufacturer with \$3 billion annual revenues and a 14% share of the world market in 1975.

M Lepicard claimed that with an 11% share of world markets,

This month Fred Lamond, European Editor of Auerbach Computer Technology Reports, considers the prospects for European mainframe manufacturers in the Eighties.

The Honeywell Information Systems-CII Honeywell Bull partnership were close to that position, and thus well set to survive into the 1980s. In the nature of things, however, there is room for only four manufacturers or partnerships to have market shares as large as those of Company C in M Lepicard's model. He believes that few of the other five US companies, the two Europeans or the three Japanese had an equally healthy financial profile.

The profile of most of them, especially ICL and the Siemens

Data and Information Systems Product Group, is probably closer to that of company D in the model, which on annual revenues of \$1.5 billion could only net some 3.3% of profit, too little to finance expansion out of own revenues, too little as well to raise additional capital on the open market.

M Lepicard showed his model to the journalists to justify CII-Honeywell Bull's continued partnership with the US-based HIS as a guarantee of future profitable survival. But he also made a public offer of partner-

ship to ICL and Siemens, to help share out the burden of developing new systems for the 1980s.

That must have startled the Siemens top management, still suffering the aftermath of the Unidata collapse, and raised a laugh in the ICL boardroom in the light of the rising profits shown in its latest annual report.

But his proposal cannot be dismissed so lightly, if ICL's and Siemens' long term prospects are really as grim as M Lepicard predicts. So the first question we have to ask is: How true is M Lepicard's model?

One assumes that it is based on CII-HB's and Honeywell's own experience. But, if so, it can only apply to manufacturers or partnerships that market all sizes of systems in all countries of the world to all types of user.

Apart from the HIS-CII-HB partnership and IBM, only one other general purpose systems manufacturer does so, Univac. All the others specialise more or less by type of system, geographical coverage, and the types of user. The economics achieved by such specialisation are not negligible.

Burroughs, for instance, has consistently been one of the most profitable companies in the industry on a mere 4% share of world computer manufacturers' revenues, simply by narrowing its market target area to the financial market, the US Federal government and US universities. NCR sells only terminals, small and medium size systems to the financial and distribution trades, while CDC concentrates mainly on large scale machines for scientific users.

ICL and Siemens have hitherto sold their computer systems to all types of user, but are highly specialised geographically. Siemens sells only in Europe, excluding the UK, Ireland and France, and in South Africa. ICL's marketing has become world-wide since it took over Singer Business Machines, but it markets only the ex-Singer intelligent terminals and transaction processing systems in those markets where it was not represented previously.

Apart from a 2903 toehold in

New York, it markets its general purpose computer systems only in the Commonwealth, and in Europe North of the Alps and Pyrenees. Its largest systems, 2970, 2976 and 2980, are marketed only in the UK, France, Germany, South Africa and Australia.

Such geographical specialisation is bound to reduce marketing and maintenance overheads. If those two cost items are cut half for company D, then its company's financial profile would be miraculously transformed from a 3.3% to a 20% profit on a \$1.5 billion turnover. But there is no room for complacency. The Lepicard model looked uncomfortably close to ICL and Siemens' reality for the first half of the decade.

During the last two years, the financial prospects of the companies have brightened considerably. ICL is expanding at last and recording increasing profits. Siemens has cut its losses sufficiently for it to bid the division as an independent profit centre in October, 1976.

Both companies have enjoyed a cut in costs in the computer part of their production and R&D costs for a full 12 months before the price cuts that they had to concede to keep in step with IBM. In the UK ICL had foregone price rises despite the falling value of the pound.

Neither factor is likely to continue to the same extent. On the contrary, North Sea oil is now causing the pound to be up on foreign exchange markets at the very moment when the end of the pay policy is likely to cause British wage costs to rise rapidly.

And like all computer manufacturers, ICL and Siemens have to start incurring increasingly heavy R&D expenditures to match the products that IBM is believed to be developing. These include a relational database management system, simple database integration and manipulation languages that can be used directly by non-computer executives, new types of mass storage, and distributed multiprocessor system architectures.

Whether those growing R&D costs are already growing sufficiently rapidly to imperil ICL's profit picture, or to place Siemens DP once more deep into the red, only they themselves are likely to know. But M Lepicard would hardly have made his offer of co-operation if he had not thought his prospective partners might have something to worry about. How feasible is such a partnership?

	In billions of US dollars			
	1978 est	1979 est	1980 est	1981 est
Users' expenditures	54	51		
Value of installed equipment worldwide	106	73		
Revenues of systems manufacturers	31	22		
Model of volume effect				
	A (12)	B (8)	C (3)	D (1)
Cost of products	28	31	36	41
Research and development	6	6	6	6
Marketing	15	16.5	18	20
Maintenance	15	16.5	18	20
Overhead	6	6.5	7	8
Profit before interest and taxes	30	23.5	18	14
	100	100	100	100
Annual revenues in comparative terms: A is an average strong company, B is half the size, C is a quarter the size of A, D is one eighth.				
Cost improvement by doubling volume:				
15% manufacturing, 10% operating expenses				
Yearly minimum R&D expenditure: 100 Million Dollars				
B: 3 competitors C: 5 competitors D: 10 competitors				

Figure 1: M Lepicard's financial model which was developed for Honeywell-Bull's take-over of

## By Fred Lamond Partnerships in mainframes

UNIDATA's inglorious collapse still rankles with Siemens, which tends to blame it on the French, and vindicated Geoffrey Cross's scepticism of formal organisational entanglements with other manufacturers.

Both Cross, ICL managing director, and Jean-Pierre Brulé, boss of CII-HB, have gone on record to say that Unidata could never have succeeded because of its cumbersome method of managing the marketing of its products. To succeed, a company must have a clear line of authority running from one man at the top.

This has usually been taken to mean that the only type of European partnership to succeed would have to be a complete merger into a single company with a single chief executive at the top.

It is hard to see any of the British, French and West German governments agreeing to a sacrifice of the much subsidised independence of their national computer manufacturers.

It may well be, however, that the trouble with Unidata was that it tried to merge too much rather than too little.

Honeywell Information Systems and CII-Honeywell Bull each has its own president, its own managerial structure, its own production facilities and marketing and support network in those parts of the world allocated a certain common product line, but has no executive authority.

As Brulé told Computer Weekly last year (CWI, November 11, 1976), it is self-interest that keeps HIS and CII-HB together in marketing each other's products, rather than any constitutional powers that the product planning committee may have. Based on the HIS-CII-HB model, ICL, CII-HB and Siemens DP division could each keep its own individual identity, corporate structure and ownership pattern, and yet co-operate in developing, manufacturing and marketing a common product range for the 1980s. But could they agree on what those products should be?

Table 2 shows the current product lines of three European mainframe manufacturers compared with those of IBM and Honeywell. By a strange coincidence there is greater similarity between CII-HB's French-developed eight-bit byte-oriented Series 60, Level 64 and the equally byte-oriented large ICL 2900 series systems from the 2900 upwards, than between Level 64 and the Honeywell-developed 38-bit word Level 66, or between the large 2900 series systems and the 24-bit word 2903/2904 range.

Both the Level 64 and the large ICL 2900 systems share also the same ANSI 74 definitions of Cobol and Fortran, and are only programmable at high level.

It would be premature, however, to see there the basis of a future common European product line. The Siemens 7,000 series, which is also eight-bit byte oriented, uses IBM rather than ANSI language standards down to Assembler level, and all three manufacturers have their own operating systems and job control languages.

All three also have their users breathing down their necks, and existing on the most complete compatibility with their existing systems. That is why Siemens has always been so dogmatic about maintaining the closest compatibility in source language

with IBM. The German government and others users treat IBM standards as de facto standards, because 80% of German installations consist of IBM, Siemens and Univac Series 90 and 9000 systems which already conform to them anyway.

For the same reason, CII-HB had to promise French government departments continued support for the ex-CII Iris range until it was ready to announce a fully upward compatible joint successor range for both it and the Series 60, Level 64. This will be PTG, to be announced in 1978 for delivery from 1979 onwards.

And ICL has had to concede DME on the 2980 to former 1900 and System 4 users not yet ready to convert to large 2900 series language standards and data formats.

When the many users of the old Honeywell 100, 200, 400 and 2000 series are brought into the equation as well, the task of designing a common successor range to which all these users could progress must look next to impossible.

However, any systems to be produced in the 1980s by surviving European manufacturers, whether singly or jointly, will have to be very different from their existing systems, to take full advantage of the low cost microprocessors and new mass memories that will then have become available. It is only by microprogrammed emulators that the systems of the 1980s will maintain upward compatibility with the current systems, and both ICL and CII-HB have already demonstrated how to make one and the same machine run under several different microprogrammed instruction sets.

Nor will the development of new hardware systems for the 1980s represent the major part of the mainframe manufacturers' R&D burden from now on. On the contrary, with increasingly cheap and standardised microprocessors available, the hardware development costs are likely to fall as rapidly as those of components and memories.

It is on the software front that the make or break investments will have to be made, especially in developing new relational or equally efficient database management systems, and the user-oriented languages with which to interrogate and manipulate them, to match those that IBM is developing.

This new systems software of the 1980s will be of a much higher level than existing operating systems and compilers, and more machine independent. Yet even some current operating systems are already portable, or at least their job control statements are, between systems with widely different processor architectures, or even data structures. The six different Levels of Series 60 all use subsets of the same GCOS and the same Cobol and Fortran compilers.

Similarly, ICL's VME/B operating system, written in the high-level S3 language, could be made portable to other hardware systems. ICL has also adopted the same IDMS database management system for the 1900 series, 2904 and the large 2900 series. Its author, the Cullinane Corp, has also implemented on the IBM 370 and the Digital Equipment PDP-11 series.

It is thus possible to envisage a pattern of co-operation between CII-HB, ICL and Siemens in the development of new high level software systems that

Manufacturers	US-owned multinationals			European-owned manufacturers			
	IBM		Honeywell	CII-Honeywell Bull		ICL	Siemens
	DP	GSD					
Competing models	3033	—	68/85	—	—	—	—
	370/168	—	68/80	(P7G)	Iris 80	2980	(7.770)
	370/158	—	66/80	—	—	2976	7.760
	—	—	66/40	—	—	2970	7.755
	370/148	—	66/20	(P7G)	Iris 60	2960	1904S 7.748
	—	—	66/10	—	—	—	7.740
	370/138	—	66/05	64/60	7740	Iris 55 (S1)	1903T 7.738
	—	—	—	—	7735	—	—
	370/125-2	3/15D	—	64/50	7730	—	1902T 7.730
	—	—	—	64/40	—	—	—
Language standards	370/115-2	3/15D	—	64/30	—	2904	1901T 7.722
	370/115-0	3/15	62/60	64/20	—	2903/30	—
	—	3/12	62/50	—	—	2903/30	—
	—	3/8	62/40	—	—	2903/30	—
	—	34	62/20	61/60	—	2903/20	Ten/220
	—	32	—	61/40	—	—	Ten/220
	—	—	6/43	—	—	—	—
	—	—	6/43	—	—	—	—
	—	—	—	—	—	—	—
	—	—	—	—	—	—	—
Cobol	IBM	IBM	ANSI 74	ANSI 74	ANSI 74 or 68	IBM	IBM
Assembler	IBM 370	None	None	None	PLAN	IBM 370	IBM 370
Fortran IV	IBM-H	—	ANSI	ANSI	—	ANSI, IBM-H	ANSI, IBM-H
PL/1	IBM	—	Level 66 models	—	—	—	—

would not disturb either their users' existing investment in older computer series, nor the three companies' individual organisational identities.

Such co-operation seems not only desirable but even essential. New languages are being

developed for the use of non-computer executives, these will have to be in each user's own national language, and correspond to national accounting conventions.

Each manufacturer might thus have to develop no less

than a dozen different user languages, one for each national market, a formidable undertaking. Co-operation between the three European manufacturers would reduce the task to about a third of what it would otherwise be.

Table 2. European mainframe manufacturers' product lines compared with partners and competitors. Note: Model numbers in bold type are systems with an eight-bit byte, 16 or 32-bit word data structure. Model numbers in brackets are of systems that have not yet been announced.

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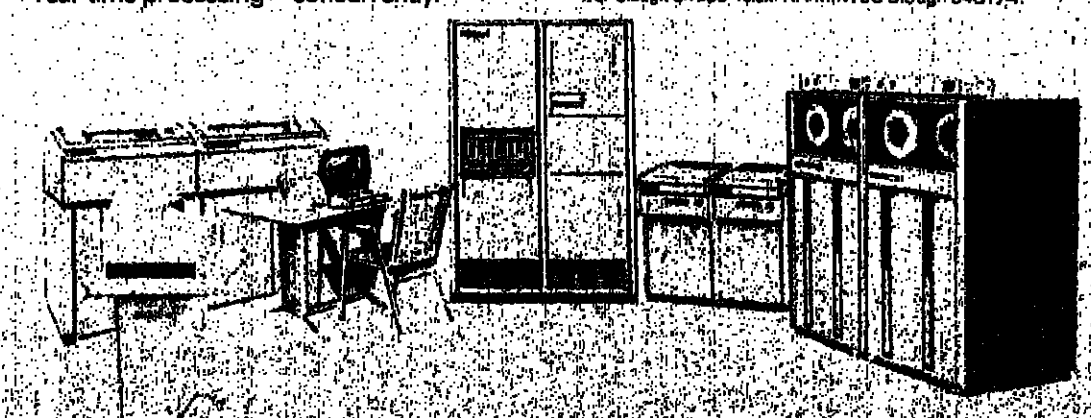
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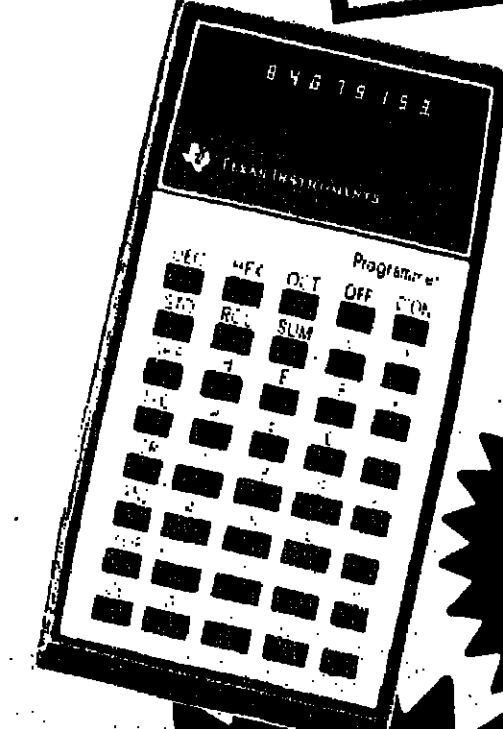
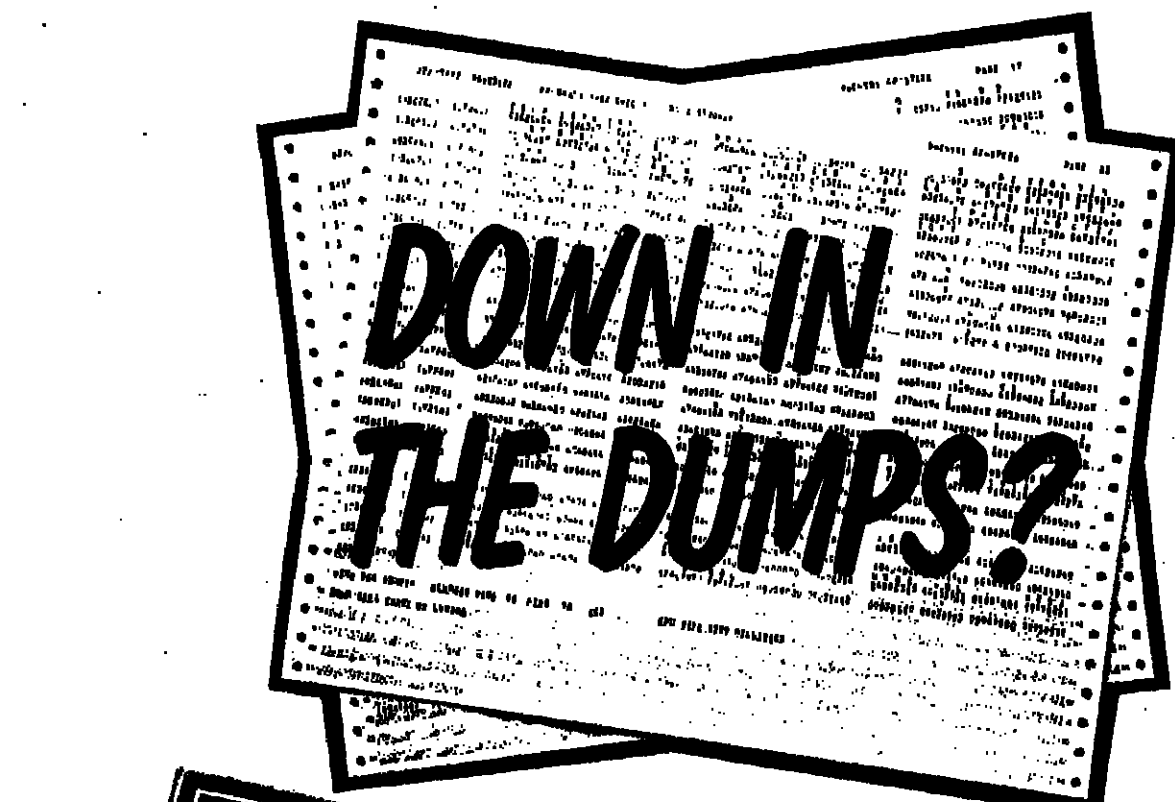
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## Motorola pollution control unit for Ford

THE rush to beat the US anti-pollution laws, due to be brought in during 1980 and 1981, has prompted the Ford Motor Company to follow General Motors in ordering microprocessor-based engine control units from Motorola.

The Ford order covers the development of the unit to be based on the 6800 series microprocessor, and patterned to meet a custom design by Ford. It will be used to control functions such as spark timing.

Motorola won the contract in a three-cornered battle with the Essex Group, a part of United Technologies Corp, reported to be working with Toshiba, and Ford's own Electrical and Electronics Division which was being supplied with microprocessors and peripherals by Intel and Texas Instruments.

Few industry observers in the US expected Ford to follow General Motors into the Motorola camp, as the General Motors order is expected to be the largest production contract for a micro ever gained. The Ford deal is, however, likely to be worth more, as it covers the complete control unit. Motorola is supplying GM only with components.

Although only a development contract, Ford seems likely to stick with Motorola for the production item. The only possible stumbling block is the question of a second source for the unit. Texas Instruments has been nominated as the favourite. While the Motorola design requires one circuit to be fabricated in integrated injection logic, Intel has ignored this process, and has become an industry leader.

# COMPUTER WEEKLY INTERNATIONAL

## Datsaab launches first of its new products

THE first of a wide range of new products planned by Datsaab of Sweden has now been announced. Called the D16/30 it provides an upgrade path for D15 users, and as well as using the proprietary Logic 3 language, is programmable in Cobol.

Built around a 16-bit mini from Computer Automation, the D16/30 supports up to 32 workstations, installed either locally or remotely. Main memory extends from 16K to 64K words and disc capacity of up to 120 Megabytes is possible.

One or two 600 lpm printers can be attached, as well as a card reader, up to four tape drives and up to five transmission adapters allowing communication at up to 9600 baud. IBM 2780, 3780 and 3270 communication emulations

are available. All the application packages written in Logic 3 for the D15 can be transferred to the D16/30, says Datsaab.

The 16/30 has been introduced in Scandinavia, and other European subsidiaries will introduce it next year. It is due in the UK at this time next year.

A basic D16/30 costs about 200,000 Kroner, £25,000, in Sweden.

The announcement follows plans to restructure Datsaab into an independent company owned equally by Saab-Scania and the Swedish government with a large injection of capital (CWI, July 21). Other new products on the way from Datsaab are an enhanced D5 banking terminal system and a Cobol version of the D12 desk-top accounting machine.



Overview of office environment showing D16/30 processor, disc stations, line printer and display workstations.

## Wall Street slump in computer stocks

THE US computer industry's bulging order book is not making much of an impression on Wall Street. In contrast to the optimism of the vendors, economists and investment advisers, the reluctance of large financial institutions to increase their investment in computer stocks remains a sad fact of economic life.

Even IBM, whose stock is usually considered an excellent investment, has suffered despite a corporate financial strategy that has minimised its vulnerability to the unjustifiably gloomy investors.

While the larger financial institutions have continued to concentrate their holdings in the larger computer manufacturing companies, the consequences of the disappointing Wall Street outlook may fall most heavily on the smaller companies, according to business analysts. The smaller manufacturers, hard

pressed to generate capital from cash flow, desperately need outside funds to meet the demands of expanding markets and fast-moving technology.

One likely consequence of the current situation is a series of acquisitions. The smaller, poorer computer firms may be taken over by their larger and richer brethren.

Two of New York's most influential stock brokerage firms, Oppenheimer and Company and Drexel Burnham Lambert, have published differing but generally favourable reviews of the prospects of the industry's future earnings. These analyses reveal a future in which the stock values of the computer manufacturers could remain constant or even drop as profits increase.

In his recent study, leading financial analyst Gideon Gartner of New York stockbrokers Oppenheimer and Co characterised most of the vendors as good investments. Nevertheless, he pointed out that the performance of the computer stocks may well fall to meet the expectations of investors.

Gartner attributes the relatively low stock values in part to technical factors, those effects based on cyclic phenomena in the market itself, which do not

always mirror investors' attitudes about the prospects for a company or an industry.

Among the points made in Gartner's study are that computer markets will grow faster outside the US than within and that a larger proportion of the users' data processing budgets will go for hardware and packaged software in the future, reversing the trend of the past few years.

Gartner believes the future of some US mainframe vendors to be particularly rosy. He likes the situations of IBM and NCR. Gartner is generally favourable about other computer companies, with the exception of Honeywell, which he believes is entering a difficult period.

Overall, Oppenheimer's forecast of computer stock prices is not very encouraging. Computer stocks are not expected to emerge from their current slump until the end of this year. Another weak period in the stock market was forecast for the summer of 1978 by technical analyst Joseph Generale.

The analysts at another Wall Street firm, Drexel Burnham Lambert, agree with those at Oppenheimer for the near future, but they expect the underlying strength of the stock market to be greater.

## Office of the future

UP to four million organisations using electronic office systems by 1990 is envisaged by Harvey L. Poppel, an electronic systems technology expert and senior vice-president of US consultants Booz-Allen and Hamilton.

He was speaking at the Automated Office conference held last week by the American Institute of Industrial Engineers and urged organisations to "get ready to do something - anything" to plan ahead for the coming of electronic office systems.

"US-wide office expenditures exceed \$800 billion annually," said Poppel, "and a significant portion is susceptible to automation. It is inevitable that electronic office systems will evolve to cut these costs and expedite the flow of information."

He went on to say that only the general purpose applications had been automated, rather than the specialised areas.

"This represents the real potential for electronic office automation," Poppel said.

## US maker moves into Holland

US SMALL business systems manufacturer MAI is planning to set up a European manufacturing plant, almost certainly in Holland. The company has just sold its thousandth Basic Four system in Europe, but has yet to establish itself in the UK market.

A new outlet, Basic Four (UK) Ltd was formed earlier this year following the demise of MAI's previous agent (CWI, March 31). "It is 98.9% certain that the new plant will be in the Netherlands," said A. E. Snelink, head of MAI Europe.

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## Univac to replace IBM in Iran Bank

FOLLOWING its success with the Iranian Ministry of Agriculture and the Abadan Institute of Technology, both of which have installed 1100 system Univac has broken into the Iranian banking sector, snatching over existing supplier IBM.

Iran's biggest commercial bank, Bank Mellat, is to install a two-processor 1100/10 to take over the workload of two IBM 370/13s which are currently running in batch mode.

In addition, the bank plans to pilot online real time terminal network for a 16-branch offices. Bank Mellat is also installing an offline back office system of eight Teheran branches with specially developed Fast I/O package terminals backed by 30,000 computers and supplied by IBM (CWI, May 5).

Univac has been in Iran only three years. ICL has been there for about two years but has yet to win any significant business.

In Japan, Univac's share of the market is declining, though the value of its installed base continues to grow.

## Potter to fight back

THE founder and chairman of Potter Instruments, John T. Potter, is to fight for control of the company in the US Federal Bankruptcy Court.

In July, two Potter directors Samuel Alexander and David Porter, tried to dismiss Mr Potter from the board. The company has been trading under Chapter XI of the Bankruptcy Act for two years.

Earlier this year, the company was accused by the Securities and Exchange Commission of concealing its deteriorating financial position three years ago, and of failing to disclose substantial fringe benefits given to Mr Potter (CWI, April 28).

## IBM switches to Bordeaux

IN response to the French government's policy of decentralisation and regional development, IBM is moving its two largest French service bureaux

centres out of the Paris area. Bordeaux.

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## Plain man's guide to the computer room By Bernard Allen

THE computer room is an odd place. It is a dynamic environment. At one moment an operator may be placing a tape upon a drive, next he may be feeding a batch of cards into a card reader, and then he might have to dash off to the store-room because the printer has run out of stationery and a deadline has to be met.

**SINCE the Op Spot column was introduced (CWI, June 9) there has been an upsurge of interest in this area of debate. Here, Bernard Allen takes a down-to-earth look at the computer room and discusses ways of improving communications, throughput, training programmes and how to encourage operators to be more efficient.**

To someone unfamiliar with the problems of operating a large computer system, such a scene might appear quite chaotic.

To an outsider there would be no guide to show whether it was a well-run department or badly run. So, on what basis may a computer operations department be judged? The most important factor is the service given to the user.

Who is the user? Basically, someone who is buying machine time. Programmers fall into this category as do the payroll and stock control departments; as do other departments depending on the nature of the business in which the firm is engaged.

When the user is getting good service, he is happy. However, when problems arise and jobs take longer than anticipated, the user too often grows irate.

He complains to the operations manager who then complains to the shift leaders, and so on down the line to the newest recruit.

Of course, errors do occur within the operations department. Tapes get lost, card decks are dropped, output is misplaced.

A certain amount of this can be tolerated and must be accepted. But the department often provides an excuse to hide the shortcomings of related departments.

By definition, the role of the operations manager is of great significance. He must possess a number of qualities such as sound judgment and the ability to communicate at all levels.

Let us consider a situation in which the operations manager must use his judgment. For a couple of weeks, perhaps, a great deal of printed output has been lost or has been returned to users incomplete.

At first, it would seem that the operators dealing with the printers are not paying sufficient attention to the task.

However, this may not be the case. A closer examination of the situation might reveal some interesting factors. For example, a new version or release of the software being used might have been implemented.

This new version will probably have a number of bugs. If this is so, downtime

used by firms in which the operators are encouraged to progress on to programming and system analysis.

Many large firms provide a number of DP courses. The problem is what such a course should encompass. Operating is a practical matter. Often things happen in the computer room and a solution is needed quickly.

Unfortunately, courses often consist largely of theoretical matter and, as such, are of little practical use.

Yet if used in combination with hands-on training such courses can be of great importance in providing solutions to the problems which occur within the computer room.

Computer operation calls for a certain expertise or techniques which can only be acquired by experience. Such techniques are difficult to define and are perhaps better described.

In a multi-programming environment, the system appears to be in a loop. No technical support is available, so what should the operator do? Search for the appropriate manual or close down the system and reload?

Of course not. A swift examination of the jobs in the system will often reveal the cause of the problem without recourse to any complicated procedure.

Good documentation would help in such a situation. It is obvious that a tried and tested program or utility is unlikely to cause a loop whereas a program under test might.

One of the facts recorded on the documentation might be the programs used by the job submitted.

The hard-won skills of the operators are overlooked. They could be put to good use when planning the layout of a new computer room, considering the use of resources or in general trying to optimise throughput.

Imaginative operators often have good ideas about the manner in which the computer room is organised, but sadly they are usually given little encouragement. Here the manner and attitude adopted by the operations manager is of great importance.

Obviously, efficiency is affected by many other considerations. Such things as the availability and maintenance of hardware are vital.

The size of the firm or, perhaps more specifically, the size of the budget, is also pertinent. Good pay and conditions are of first importance, but operators must also be encouraged to exercise and extend their skills.

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### Shift Leader £3,800 Surrey

A 1904A with 4 EDS 60's, 2 line printers, four 9-track decks, and two 7-track decks - that's our Client's present configuration, which operates on two shifts - although a third shift may soon be introduced. With at least three years ICL experience, including six months as a Senior Operator, this could be your chance to take full control of a busy computer room.  
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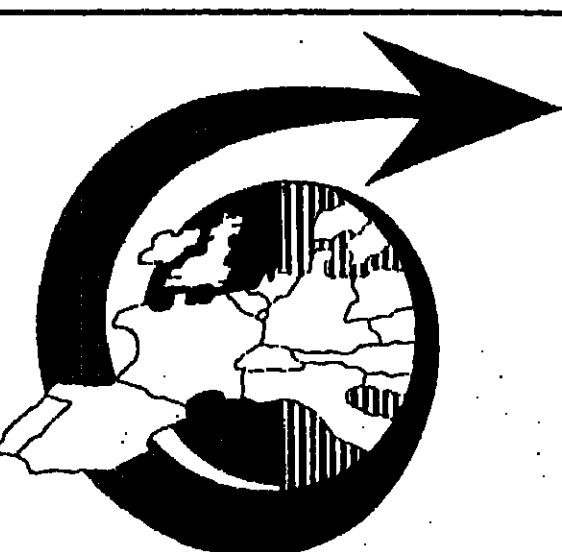
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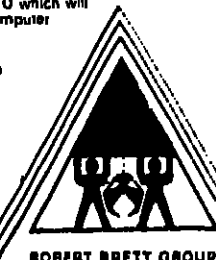
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Equal emphasis on personal development of staff in line with their personal aspirations and abilities.

#### The Opportunities

Promotion is from within — the work plan will provide both the challenge and opportunity for those who have the ability and the ambition to progress. For the travel conscious, 12 people from the centre provided project support in overseas locations last year.

Our clients invite applications from candidates with 2½ years plus experience in data processing and offer above average conditions of employment including: staff bonus scheme, relocation expenses, excellent fringe benefits and recreational facilities including squash courts.

CONTACT: David Wade, 061-833-0876.

Ref. No. 77/09/10.

### SPECIALIST COMPUTER RECRUITMENT LTD.

BIRMINGHAM 021-236 3781 FREEPOST  
Freeport, Equity and Law House, 35-37 Great Charles Street Queensway, Birmingham B3 2BR

MANCHESTER 061-833 0676 FREEPOST  
Freeport, Corn Exchange Buildings, Corporation Street, Manchester M4 8BD

LONDON 01-935 0671 FREEPOST 6  
Freeport 6, 102 Blandford Street, London W1E 1JZ



## how good are your prospects?

If your present environment is restrictive and unrewarding and you want the chance to use and extend your expertise in a very progressive atmosphere, then we can offer you that opportunity. It means working hard, but the satisfaction of achievement and the benefits gained are quite exceptional.

CRL abacus, firmly established as one of the leading and most successful software companies in the country, now has over 120 people engaged on in-house and on-site work for many of the leading companies and organisations throughout the UK. In addition we have assignments in Europe based on our offices in Brussels as well as projects further afield.

From offices in London, Manchester and Coventry, we have achieved an annual UK turnover in excess of £1 million.

We have our own 2903 computer in Coventry, plus the facilities of an IBM 370 in London and the Midlands in association with another company in our group — CRL Bureau Services.

And all this has been achieved in a comparatively short space of time and in spite of the general economic situation.

Our reputation is high in the specific areas in which we operate — total project responsibility, project management, systems design, specialist programming, computer installation management and comprehensive small business systems services.

Our success has been made possible by sound management and financial control and, most important, by the professional and ambitious people who join us.

Now for our further expansion we need more of those people who feel as we do — that promotions should be made from within the company and considerable rewards be given. Also, for those who wish it, there is the opportunity to work overseas.

Our immediate need in London and Coventry is for

### PL/1 programmers

Preferably with IMS experience who will enjoy the challenge and variety of a wide range of interesting, and sometimes unusual, projects, requiring the full use of your experience.

### Systems designers and project leaders

Who certainly must have IMS experience and who have the personality and qualities to accept total responsibility for their projects. These are senior and important positions where you will have the opportunity to demonstrate management skills when working in close liaison with client staff and our own personnel.

### benefits

Whilst we don't imagine you would join us simply for financial rewards, we do operate a very good benefits package — profit sharing scheme, pension and life assurance and BUPA. If you wish to relocate to the Midlands, we will provide assistance with relocation expenses, and housing is cheaper than in the South. Also, based in Coventry, you can enjoy the beautiful Warwickshire countryside and you are very well placed for fast trains to London and a network of motorways. In London you gain the advantage of our special Home-based Expenses Plan. And if you really know your job, salary will present no problem.

### New SALES opportunity in Leeds

This is one of those ground floor opportunities where the right person can certainly achieve considerable success.

Because of our success in Yorkshire, we are opening an office in Leeds early in 1978, and we wish to appoint someone to handle all sales in this area.

Obviously, software sales experience is important and a knowledge of the local market would certainly be an advantage.

Target remuneration will certainly match your ambitions.

For this appointment, please write to the Managing Director, David Whitehead, in Coventry.

For opportunities in London, Coventry, please write to or ring

Barbara Prior  
58 Great Marlborough Street  
London W1. Tel: 01-437 4085

Sue Benger  
48 Queens Road  
Coventry, CV1 3EH  
Tel: 0203 21113

### IBM OPERATOR

370/DOS installation require two years + experience for a two shift system. E.C.2. Company.

£3700 + perks

### SENIOR OPERATOR

Eighteen months + experience with GII, three shift system. Hertfordshire installation.

to £3800 pa

### CLIENT LIAISON

Must have a stable computer background and be able to deal with people of all levels. Accounts / business experience preferable.

£4000 pa

### OPERATOR

This company require experience with any third generation machine, eighteen months +, twelve hour shifts — W.1.

to £4000 ann

### ICL OPERATOR

Two shift system, 1900 GII or Manual experience — nine months + W1 installation.

£3000 + pa

### OPERATORS

Two years + experience on any machine for E.C.2. Installation with two shifts.

to £3500 pa

### COMPANIES

LOOKING FOR STAFF?

Telephone Avril Lively who will take the job details from you.

01-402 0933

### SHIFT LEADER

Two years + experience on IBM 370/126 DOS/VS installation for E9 company with a three shift system!

£3700 pa

### IBM OPERATOR

One year + experience on IBM 370/DOS/POWER/VS installation in Essex. Four shift system.

£3400 + pa

### STAFF

LOOKING FOR JOBS?

Telephone Avril Lively who will tell you about these and many other jobs available.

01-402 0933

### DATA CONTROL CLERK

Two years + experience for W.1 company — lots of client liaison.

to £3500 pa

### OPERATORS

£3700 eighteen months + experience Two shift system for EC4 installation.

to £3800 pa

### SENIOR OPERATOR

Two years + 1900 GII + experience Four shift system for EC1 installation.

to £3900 pa

### JUNIOR OPERATOR

Six months + experience IBM DOS/VS. Three shift system. Surrey company.

£ Excellent + O/T

### SHIFT LEADER

Three years + experience 1900 GII — two shift system. Surrey installation.

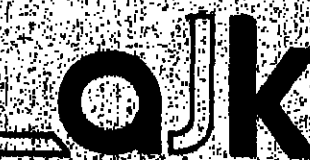
to £3800 pa

### SENIOR OPERATOR

Two years + experience IBM 370/DOS/POWER: two shift system Essex installation.

£3500 pa

**AJK RECRUITMENT LIMITED (Emp. Agt.)**  
26 Chilworth Street, Paddington, London, W.2  
01-402 0933



member of the Computer Resources Group





## 'Should we get a 138'?

A Senior Systems Analyst is required at Wyeth Laboratories to undertake feasibility studies and develop new systems in the Production Control and Financial areas.

He or she must have at least two years' experience in a commercial environment and be capable of leading a small team. We also need a small team to assist in this and to design systems to use TP and a Data Base.

Please apply to:  
Mrs. J. Andrews, Personnel Officer,  
Wyeth Laboratories,  
Huncombe Lane South, Taplow,  
Nr. Maidenhead, Berks.  
Telephone: Slough 28311



Wyeth Laboratories

ROYAL NATIONAL INSTITUTE FOR THE BLIND

## TWO PROGRAMMERS

for Publications Department

(Moving to new premises near the Angel Underground Station 1978)

We are soon to replace our current system with a dual mini-computer system for online production of braille literature. As a result, we have two more posts for people with plenty of initiative who ideally will have experience in some of the following areas: FORTRAN, Assembler, microcomputers. Training provided. Opportunity to get in on ground floor of exciting new project. Salary: £10,000-£13,000 or £13,000-£15,000 dependent upon qualifications and experience. Free lunch in staff restaurant.

Applications giving age, present salary, qualifications and experience, together with two referees, to Mr. R. Hagger, Works Manager, 224 Great Portland Street, London W1N 6AA.

We have been retained by one of our clients to recruit the following personnel:

SENIOR ANALYSTS  
ANALYSTS  
SENIOR DESIGNERS  
DESIGNERS  
SPECIALIST/SENIOR PROGRAMMERS  
PROGRAMMERS  
All to be based at Croydon, Surrey.  
Ring Sue 01-877 3021 for an immediate appointment. PS Appointment, 181, Mitham Lane, London, SW16.

Stafford Borough Council

## TECHNICAL ASSISTANT

(Up to £5,065 p.a. incl.)

Applications are invited for the above newly established post which has the status of Section Head in the Treasurer's Department. The successful applicant will be principally responsible for the appraisal, design and introduction of computer systems; together with the monitoring and scheduling of date-work flows. Salary within Grade SO1 (£4,239 to £4,645 plus salary supplement). For further details and application forms apply to Personnel Officer, Borough Secretary's Department, The Hollies, Newport Road, Stafford ST16 1BE (Tel. Stafford 3181, Ext. 218) quoting Post Ref. No. 412. Closing date 21st September, 1977.

AnCO - The Industrial Training Authority

## Scientific / Software Programmer

Dublin

Applications are invited for the above post in the Data Processing Division, in Beggot Court, Dublin. The successful candidate will be responsible for programming of scientific applications, mainly in the statistical field.

Applicants should have at least two years programming experience using FORTRAN. A degree with a scientific/statistical content would be desirable. The salary scale rises to £5,215 per annum. There is a contributory pension scheme in operation.

Application forms are available from:  
Personnel Officer,  
P.O. Box 456, Beggot Court,  
Upper Beggot Street, Dublin 4.  
Telephone 01/885777.

Completed forms, quoting reference 173/1, should be returned not later than 27 September 1977.

**AnCO**  
The Industrial Training Authority

# Programmer- 1 year's experience London

Have you a minimum of 1 year's experience in COBOL or PLAN? If so, we can offer you an ideal opportunity to join a rapidly expanding computer department at Courage, one of the big six in the Beer and Wine & Spirits business.

We currently use an ICL 1903T, using Maximop and George II.

This month we are taking delivery of a second 1903T to cope with our heavy workload, whilst also considering further hardware requirements.

Our development plans include the implementation of Database, Management Information and On-line order processing systems, as well as several accounting systems.

If you are interested in advancing your career with us, then write giving details of career to date, or telephone for an application form to:

R. D. Moles, Courage Computer Dept.,  
Saccane House, 17 Cumberland Avenue,  
Park Royal, London NW10.  
Tel: 01-965 8844.



**Courage**

## SOFTWARE SCIENCES

Our client, the Horserace Totalisator Board, has formed a new company, Tote Computing Services Ltd., to provide a service to all divisions of the Tote and to operate in the external commercial market. New staff are being sought for this company to play a major role in the introduction of new commercial systems and to assist in the development and implementation of a challenging real-time system for on-course betting. The three positions to be filled now are:

### Senior Systems Analyst, around £6,500

with at least 5 years' solid commercial experience, preferably in a 1900/COBOL disc and tape environment with on-line enquiry systems. Proven knowledge of purchase/nominal/sales ledger systems would be an added advantage. This person would be expected to act as deputy to the computer manager and as project leader for the introduction of new systems next year.

### Analyst/Programmer, around £4,750

similar experience to the above but with a stronger programming background, which ideally would also include some DFC minicomputer experience.

### Programmer, around £4,000

with at least 2 years' COBOL experience preferably on a 1900. A knowledge of PDP 11/34 and RTL 2 would be a distinct advantage.

Verifiable evidence of working in a well-documented environment, coupled with the ability to deliver on time and within cost will be expected of all applicants. These are ground-floor opportunities for professionals. The location is London (EC4), within easy reach of Blackfriars and Waterloo. There is a pleasant working environment and a subsidised canteen.

Interviews can be arranged in either London or Farnborough. Please write in the first instance, detailing career and salary progression, to Patrick Whale, Software Sciences Limited, Abbey House, 282/292 Farnborough Road, Farnborough, Hampshire.

## Systems & Programming Professionals

London

## Engineer Programmers - A Company that will keep you interested

Exciting things are happening to this country's telephone network and STC is, as ever, at the forefront. As leaders in our field we are continually pushing forward the boundaries of electronic switching technology.

Test programming plays a vital part in the on-going development of our systems. The job involves preparing test programs using a high level language and deriving test-generation techniques to control the testing of PCB assemblies on ATE. An experienced Engineer (male or female) will advise designers on the 'testability' of their designs.

If you have a background in testing, fault-finding, commissioning or a similar field using modern electronic techniques, we will broaden your experience. And remember, a Company like ours is big enough to KEEP YOU INTERESTED.

For further information telephone Mike Batsch on 01-235 7030 Ext. 233 or write to  
Mike Randel, Electronic Switching Products Division,  
Standard Telephones and Cables Ltd.,  
Oakleigh Road South,  
New Southgate, London N11 1HB.

**Standard Telephones and Cables Limited**  
A British Company of I.T.T.

## Computer Operations Controller

London Oil Medine, which is engaged in the marketing of edible oils and fats and is part of a British owned international group, is changing its computer to an IBM System/32.

An experienced operations controller (male or female) is now required to be responsible to the D.P. Manager for all aspects of operating, data control and data preparation, with a staff of 7. The person appointed should have a mature personality, sound relevant experience and a capacity for hard work. Applicants must be willing and capable of assuming full managerial responsibility yet maintain a flexible approach concerning their own daily activity.

Salary is negotiable and a contributory pension and life assurance scheme is in operation. The position is based at Camberwell, London.

Please apply, giving brief details only and requesting an application form to:

Mr. J. Holland,  
London Oil Medine,  
181 Camberwell Road,  
London SE23 8P.

# Systems Programmer

## Match the challenge of a new installation

### Kent Based

Our client, the Bexley London Borough, is setting up a new installation and now wishes to recruit a Systems Programmer to be completely responsible for all software development.

This new installation will comprise of an IBM 370/138 under DOS/VS with CICS and DL1. The main area of development will be to establish a database for their Central Accounting System, but there is also a wide range of general local government systems to be fully revised.

You must have a sound knowledge of BAL and 3 to 4 years' DOS experience. Ideally you will be familiar with

### Salary up to £5,200 p.a. Plus car allowance

CICS and DL1 but full support and training will be available in these specialist areas.

This is an interesting and challenging opportunity to gain valuable experience.

A salary of up to £5,200 p.a. is offered, which will be negotiable according to your experience. The benefits package includes 25 days' holiday plus 7 statutory days, a generous car allowance, and assistance with relocation expenses where appropriate.

For more information, please contact Marilyn Black quoting reference no. 747.



**JOHN GOLDSMITH** (Computer Recruitment) Ltd.

John Goldsmith (Computer Recruitment) Limited  
15 Buckingham Palace Road, London SW1  
Tel: 01-828 5356, 24-hour answering service

## JBA

### Sales Executives

London & Home Counties c. £10,000+ on quota plus car  
A well known manufacturer wishes to expand its sales force and therefore has opportunities for professional Sales Executives to join an existing team which is well established with an excellent record over the past few years.

Applicants should have at least two years' experience of selling minicomputers, VRC's or computer services and be able to demonstrate a proven ability in the computer sales field.

Immediate interviews will be arranged for suitable candidates.

Contact: Jim Baker

### Support Executives

Various Locations neg. to £8000  
Excellent opportunities have arisen for experienced systems support persons seeking to work in one of the following areas: London, Manchester, Birmingham, Bristol or Leeds.

The Company, a leading international group wishes to appoint d.p. professionals with practical experience of COBOL, communications and operating systems preferably gained on the ICL range of machines. Applicants should have had around three years' programming and design involvement and be keen to participate in systems analysis, and have considerable customer contact.

The company offer a wide range of excellent fringe benefits.

Contact: Margaret Stevens

### 2900 COBOL Programmers up to £8000

COBOL Programmers with VME/B experience are at a premium and our client is willing to offer a generous salary, with relocation expenses where applicable to the right person. Successful candidates will join a young, lively and ambitious team engaged on a wide variety of projects based primarily in the South of England.

Large company benefits and excellent opportunities.

Contact: Jim Baker

For further information on any of the above vacancies please contact the appropriate consultant. If your qualifications do not match the above positions but you are seeking other opportunities please contact us anyway.

**JAMES BAKER ASSOCIATES**  
International Personnel Consultants  
16 Maddox Street, London W.1 Tel: 01-491 4478

### Senior Fortran Programmer

London up to £6000  
A vacancy exists within the project team which provides a computing service to a number of engineering groups. A large variety of powerful packages are supported for the use of technical departments. The range consists of Engineering Design and Statistical Analysis and the work includes Implementation, customer support and package development. This is a small team operating in a very significant area providing stimulating and challenging work.

Applicants should have previous relevant experience.

Excellent staff benefits and career prospects.

Contact: Margaret Stevens

### Design Engineers

London & Berkshire up to £6000  
Our client, a well-known international organisation has immediate requirements for Engineers to assist with the development of computer systems.

Successful applicants are likely to have had at least 2 years' in the design and development of peripheral or communication equipment and must be capable of specifying and co-ordinating the production/testing process. Knowledge of minicomputers or microprocessors would be a distinct advantage as would experience as a systems engineer.

Salaries are negotiable. Large company benefits.

Contact: Mike Creamer



# MYRIAD APPOINTMENTS LIMITED

Computer Personnel Consultants

## ANALYST/PROGRAMMER

WEST OF LONDON

Up to £6000

Our Client is a Systems House operating in Middlesex. They currently require several additional staff, prepared to operate in an Analyst/Programming mode to develop new systems for both their Bureau Users and to enhance their own software products.

The successful applicants will have had several years' experience, preferably on at least one manufacturer's equipment. Extensive COBOL programming, combined with some analysis training, is required, although additional training on the Company's systems and products is envisaged.

The Company, a subsidiary of a major international group, is a comparatively small but rapidly expanding systems house, offering a friendly and pleasant environment in a very attractive area close to both M3 and M4 motorways.

## DEVELOPMENT PROGRAMMERS

Any Language

£5000

A successful company is recruiting Programmers to fully participate in its new stage of growth. It has a range of IBM mainframe and PDP minicomputer hardware.

The basic requirement is TWO YEARS' COMMERCIAL EXPERIENCE. Any previous minicomputer experience would be an advantage. Applicants should be willing to learn a new language and receive formal training in advanced programming techniques.

Successful candidates will initially contribute to the development of an on-line system. They should have the potential to become further involved with users' requirements in the future.

An attractive range of fringe benefits including mortgage assistance (after a qualifying period) and loan schemes is offered.

## ANALYST/DPM DESIGNATE

NEW INSTALLATION

ESSEX

£5000-£5500

Our client, a manufacturing company based in Harlow are currently transferring their computing activity from a bureau base to a new in-house installation comprising IBM small/medium range hardware.

They wish to appoint a Systems Analyst capable of progressing within a short period to the position of Data Processing Manager.

Suitable candidates will be able to offer proven experience in both analysis and programming. Ideally, but not essentially, they will have knowledge of RPG II and will have worked in a manufacturing environment.

The person appointed will play a major role throughout the installation period, after which they will assume responsibility for the live systems. Plans for further computerisation include the development of a production control system and an on-line management information system.

## ASSEMBLER PROGRAMMERS

S. HERTS/MIDDXX.

£4000-£5500

Current requirements and forward plans to keep abreast of advances within the computer industry have created positions within a specialist programming department. The company is interested in meeting people who wish to become more familiar with facets of the operating system in their IBM 370 installation.

Ideally the candidates should be able to offer a minimum of two years' ASSEMBLER and the ability and desire to become Software Programmers.

Full training will be provided and there will be real opportunities for individual career development. These are first-rate openings for those seeking a high degree of job satisfaction in addition to an increase in their future level of remuneration.

Please telephone for a confidential discussion or write to:  
30 Fleet Street London EC4Y 1AA  
01-353 5868

# Software house seeks owners SPECIALISTS TO C. £6000 - £8000

### Our success

- Holland Automation is an international company formed in 1974 and the Group turnover for the first half of 1977 exceeded £350,000 in Holland and the U.K. from pure systems and programming activities.
- the Group's success and its high reputation has been gained from the production of high quality software in the commercial and development software areas of both clients and the major European computer manufacturers and micro-processor companies.

### We need

- software specialists to work within application groups on small business interactive systems.
- specialists to work on micro-processor projects for new hardware prototypes.
- responsible personnel capable of working without detailed supervision.

### You need

- minimum of four years' proven programming experience in assembler languages, BASIC or PL-1 on small business systems, mini-computers or micro-processors.
- to be self-motivated and have worked on computers in a commercial environment.
- to have worked on micro-processors, software development for a manufacturer, or data transmission experience would be an advantage.

### Applications, including c.v. in writing to:

Mrs. B. Aiken  
Holland Automation International (UK) Limited  
457a & 459 Bath Road  
Clippensham, SLOUGH SL1 6AA, Berks.

or telephone for Application Form—Burnham (062 86) 85232/3.

### Our method

- all employees are shareholders.
- all shareholders are employees.
- only method of operating a successful software house is with enthusiastic highly motivated staff who are given responsibility and a high degree of involvement in the Company.
- provision of a strong bond between employees and the Company.

### We offer

- work on variety of projects on latest up to date interactive systems and micro-processors.
- good working environment with enthusiastic motivated personnel aiming to produce good quality software.
- good competitive salary up to £6,500 dependent upon experience plus bonus participation based upon performance.
- full shareholding option and participation in company profits.
- car or car allowance.
- pension and life assurance and medical benefits.
- four weeks' annual holiday.

### We do not

- offer working on large scale projects as part of a big team with little feeling of involvement.
- guarantee an unemotional feeling towards the Company.
- want staff who consider themselves more important than the Company or its customer.
- need consultants by name and not by proven deed.
- require staff who cannot work without detailed supervision or no commercial knowledge.



## Promotional Opportunities

The fulfillment of a long term planned expansion programme has resulted in our client wishing to recruit the following additional personnel for its IBM installation in CENTRAL LONDON. Further plans are also at an advanced stage that will augment the present configuration by the introduction of DEC PDP equipment, which will be used extensively for teleprocessing.

### Chief Programmer up to £6000

To take direct charge of a small team of programmers, the person we are seeking should have a minimum of four years experience of IBM COBOL under DOS or OS. A knowledge of DEC teleprocessing equipment would be an added advantage. The job would particularly appeal to a person looking for the opportunity of a management position while at the same time maintaining a high degree of technical and practical programming involvement.

### Programmer Analysts c£5000

Reporting to the Chief Programmer, the position requires a person who prefers a programming bias to their job content. However, in view of the heavy commitment to new projects, applicants should be prepared for a certain amount of associated analysis work.

Experience of COBOL, under either DOS or OS, are essential technical requirements.

Both positions carry the usual benefits associated with a member of a large public group of companies.

MAYFAIR CW36/1

## Systems Analysts City of London up to £6250 + mortgage

A large international banking organisation has engaged our services to assist with the recruitment of Systems Analysts for their installation in the City.

Applicants should ideally have experience of banking systems on an IBM 370. However, candidates with a good proven record of success in other application areas, and who now wish to add banking to their career record, should also apply.

Company benefits include a home loan scheme, free lunches, pension scheme and a total holiday entitlement of over five weeks.

MAYFAIR CW36/2

## PDP II RSX IIM up to £6500 London

An international organisation based in London, having one of the most sophisticated real time systems incorporating a worldwide communication network, is seeking additional programmers.

Based on DEC PDP II's and running under RSX IIM using RTL 2, our client wishes to recruit programmers and systems programmers at all levels. Candidates currently seeking a move which will combine technical expertise plus career progression and have worked on PDP II systems should contact the advising consultant as soon as possible.

MAYFAIR CW36/2

## Analyst Programmers for the Energy Field

### London Based

Have you qualifications and energy to reap the benefits offered by our client, a major international oil company, in the growing North-Sea energy business. Commencing Salary is up to £5500 with a comprehensive list of valuable company benefits, including free lunches and season ticket assistance.

Preferably you will have two to three years commercially based IBM COBOL experience and a second language, either Assembler, RPG or PL/I. The job offers you the opportunity to use your communicative skills through contact with users. You will probably be under thirty and a graduate with analytical experience.

To discuss the full specification of this exceptional opportunity, contact the advising consultant now.

MAYFAIR CW36/4

Telephone 01-499 9214

Kingston: 44 Wood Street, Kingston upon Thames, Surrey.  
Telephone 01-549 3212 (24hrs) Telex 27950  
Mayfair: 5-6 Yarmouth Place, Brick Street, London W1Y 7DW.  
Telephone 01-499 9214 Telex 27950  
Dublin: Canberra House, 24 Lower Leeson Street, Dublin 2.  
Telephone 762170 762188 765692 Telex 30742  
Amsterdam: Rivierstraat, Amstelwijk 166, Amsterdam 1010.  
Telephone 461844 Telex 11336



Computing  
Services  
Association



William Key & Partners Limited 

## CONSULTANT PROGRAMMERS MANCHESTER & YORKSHIRE



**SALARIES  
£3500 - £6000**

Gemini Computer Systems Limited, with offices in London and Manchester, is the U.K. operating company of the CAP GEMINI SOGETI Group. The CGS Group employs over two thousand professional consultants in twenty-one countries throughout Europe and the Middle East. The range of services offered by Gemini in the U.K. includes Consultancy, Feasibility Studies, Hardware and Software Evaluation and Selection, Systems Design and Programming.

Gemini continues to expand in the North and wishes to recruit a number of experienced Programmers to work on a variety of interesting projects both in-house and on Client sites.

Current requirements are for Programmers with a sound educational background and any of the following:

- ★ At least two years' Commercial or Systems Programming experience.
  - ★ IBM COBOL/PL1 experience and/or assembler level language.
  - ★ Working knowledge of on-line or database techniques.
- If your experience matches the above requirements and you feel you have the ability to work on your own initiative, Gemini is able to offer the following rewards:
- ★ Basic salary up to £6000 + profit sharing bonus.
  - ★ Travel and subsistence expenses.
  - ★ Free life assurance and permanent health insurance.

Interviews for the above positions will be held in Manchester or London.  
To arrange an early interview, telephone Liz Segal on 061-834 2271 during office hours, or 061-928 5486 after 6.30 p.m. and at the weekend.

William Key & Partners Ltd., 604/608 Corn Exchange Buildings  
Corporation Street, Manchester M4 3DD

## COMPUTER SYSTEMS ENGINEER MANCHESTER

KRATOS Ltd. manufactures the D550 and D5300 ranges of data systems which provide real time processing of data generated by scientific instruments.

KRATOS now needs a COMPUTER SYSTEMS ENGINEER to be responsible to the Data Systems Product Manager for the specification, procurement, checking and installation of the system hardware.

Applicants for the post should have:

- ★ Sound knowledge and practical experience of mini-computers using high level operating systems.
- ★ Minimum of 2 years' experience of installation and/or commissioning.
- ★ A degree or equivalent in Computer Science.

A competitive salary is offered.

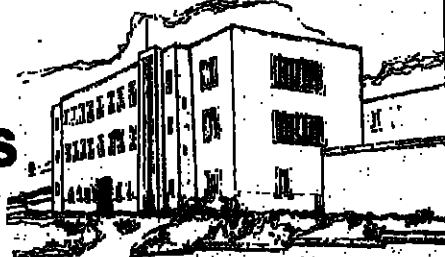
William Key & Partners Ltd. has been retained to fill the above post. Please write with brief details or telephone for an application form: Liz Segal, William Key & Partners Ltd., 604/608 Corn Exchange Buildings, Corporation Street, Manchester M4 3DD. 061-834 2271 during office hours, or 061-928 5486 at other times. Ref: CW 8508.

## Computer Operator To £3500 p.a.

We have a vacancy for a male or female operator for our IBM 360/30 computer based in our Head Office at Purfleet. This is a 128K machine with transmission links to our mills in Lancashire and Cumbria. Two Shift working is involved alternately 7.00 am-3.00 pm and 3.00 pm-11.00 pm on five days per week, with occasional paid overtime.

At least one year's experience as an operator of a similar machine is needed, together with a minimum of a Grade 3 pass in 'O' level or a Grade 1 in CSE Maths. A starting salary of between £2,500 and £3,500 will be paid depending upon aptitude, age and experience.

Please apply in writing to the Staff Personnel Officer, Thames Board Mills Ltd., Purfleet, Essex. RM16 1RD. Telephone Purfleet 5855 Ext. 2337.



## ON-LINE DATA BASE CROYDON

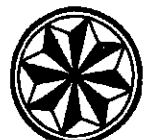
We are an expanding insurance company, developing two major TP systems for an IBM 370/138 using CICS and DL/I. The programming teams for these projects are now being established, and we have a requirement for the following DP personnel:-

### SENIOR PROGRAMMERS

With three years' experience of COBOL/ASSEMBLER, and Leadership Potential.

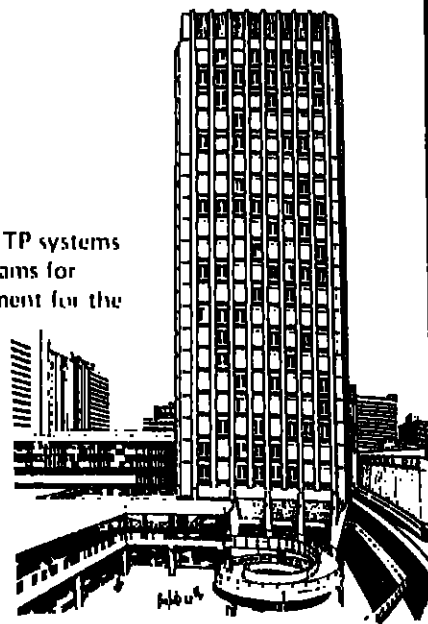
### PROGRAMMERS

With two years' experience using COBOL/ASSEMBLER. TP/Database experience would be an advantage but, basically, we are seeking staff who are capable of making a positive contribution to a growing organisation. If you are interested, contact our Personnel Manager, Mrs. Jean Knight, at the following address:-



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## REPRESENTATIVE SOFTWARE SALES

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SDI are the creators of the successful Systems Software products GRASP, GRASPSV, FLEET, EPAT and REACH, which enhance the performance of IBM computers. We are expanding our activities in the Systems Software market in Britain, where our products have gained recognition since 1968.

We are now ready to gain maximum penetration of a highly promising and under-exploited market.

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You will be responsible for broadening our client base and exploiting every opportunity that arises within the developing United Kingdom market.

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Malcolm White SDI GB  
Masons House  
Kingsbury Road LONDON NW9 9NG.

**SDI**

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## Oxford Medical Computer Centre

PROGRAMMER Scale 1/4

Salary:

Scale 1 £3,003 + 5% — £3,846 + 5%  
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Scale 4 £3,846 + 5% — £4,856 + 5%

A Programmer is required to complement a team producing real-time hospital systems in Oxford. The job will provide an excellent opportunity to gain experience in real-time programming. Knowledge of one or more of the following would be especially useful: CTL Modular One, DEC PDP-11, Real-time Systems, Database Systems, Hospital Computing. The job is on a fixed term contract until March 31, 1979.

For further details and application form please contact (quoting reference V84/77), The Recruitment Officer, Oxford Regional Health Authority, Old Road, Headington, Oxford OX3 7LF. Tel. Oxford (0865) 64881, Ext. 265. Closing date for applications 27th September, 1977.

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## Mail Order Senior Analyst Wiltshire £5500



Book Club Associates is the fast growing leader of the U.K. book club market and is jointly owned by W.H. Smith & Doulton. We are highly dependent upon computer based systems and an experienced analyst is required in our expanding Management Services Department.

You will work on developing a variety of important commercial projects based on ICL 2970. You will ideally be of degree standard with some programming experience and at least 2-3 years systems work.

Conditions of employment are excellent as you would expect from a company associated with W.H. Smith—and generous relocation expenses will be paid.

Write giving brief details of age, qualifications, experience and present salary to:

Senior Personnel Officer, W.H. Smith & Sons Ltd, Greenbridge Road, Greenbridge Industrial Estate, Swindon SN3 3ED.

Knight Wegenstein International Management Consultancy, of which Mouncey's are a member Company, have been retained by a Major Corporation in Saudi Arabia to select and recruit the following important Data Processing Personnel. The Corporation, is the Saudi implemented a recruitment policy, which has encouraged the appointment of in excess of 50 experienced European Senior and Line Managers into the Company, who will direct its future development program.

## DATA PROCESSING MANAGER

£15,000 p.a. Tax Free

The successful candidate will initially undertake the Feasibility Study, Development and Implementation of the computerisation of their large scale parts department. Ideally candidates should have had several years' experience in D.P. management including experience of a "cold start up" situation, site preparation, conversion from manual systems, and the training and selection of staff. This experience would have also been obtained in a major European industrial or commercial organisation. An in-depth knowledge of System 3 or System 34 would also be advantageous.

## SENIOR ANALYST/PROGRAMMER

£12,000 p.a. Tax Free

The successful candidate will assist the newly appointed Data Processing Manager in the tasks identified above. This appointment will require a person with at least seven years' experience in D.P., three of which should have been in a Systems Analysis and Development environment. A sound knowledge of IBM Hardware is a pre-requisite of this appointment.

## CONDITIONS OF EMPLOYMENT

In addition to the salaries identified, both these appointments carry the following additional benefits. Free furnished accommodation, Company Car, Fare Paid annual leave in U.K. for the whole family, free Medical expenses, 4 weeks' annual holiday.

Please send your C.V. to Rod Evans (Director of Personnel)



Mouncey & Partners Limited (Recruitment Services Division)  
York House, Empire Way, Wembley, Middlesex HA9 0PA  
Telephone Number: 01-903 4901

## Shift Leader and Operator Top Rates London

Our client has exciting plans for the future, including the development of a Trans-Atlantic circuit leading to a wide diversification of international computer usage. As the Computer Services Department expands to take on these challenging projects the prospects for promotion will be good.

The equipment consists of an IBM 380/50 with a megabyte of core. The work involves setting up computer runs and print-outs for commercial and technical applications. The people we currently need are:

**SHIFT LEADER** up to £4,250 p.a.  
+ 25% shift allowance.

You will need 3/4 years' DP experience, including OS MVT/HASP and preferably DOS. Age probably mid 20's.

**OPERATOR** up to £3,500 p.a.  
+ 25% shift allowance.

A minimum of 1 year's experience, operating in a similar environment. Age probably 18-22.

Both these opportunities are for men or women with the ambition to succeed and the ability to work under pressure. Please write in complete confidence, with full details about your age and experience, to:

J. Bye (Ref SLO/CW), Lockyer, Bradshaw & Wilson Ltd., North West House, 119/127 Marylebone Rd., London NW1 5PU.

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LIMITED

## Senior Programmers

To maintain the expanding demands on the installation by Group users, Courtaulds I.B.M. Bureau at Spondon, near Derby, seeks a number of Senior Programmers having approximately two years' experience in ASSEMBLER and/or COBOL and/or PL/I.

The installation is currently being up-graded to 2 x 370/126 with 3340 drives and DOS/V5/GRASP.

Applicants should be prepared to undertake an initial programming assignment of some two years following which there will be opportunities for persons of appropriate ability to transfer into systems work if they so wish.

Progressive salary based on experience; relocation assistance where necessary and other large-company benefits.

Please write to the Administration Officer, H.Q. Depts. (HP/102), Courtaulds Ltd., P.O. Box 16, Coventry, or for further information ring Alan Wright at Spondon on 0332 81422 extension 2237.

**COURTAULDS**

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We currently wish to interview Programmers, Systems Analysts, Analyst Programmers and Consultants for a broad range of clients in England, Australia and South Africa. Salaries range from £3,000 to £10,000 p.a. If you are interested, why not telephone Chad Stolper at (01) 242 2142 for an informal discussion. Alternatively if you prefer write to him at:-

Prescott Computers Limited  
6 Bloomsbury Square  
(01) 242 2142 London WC1A 2LP Telex 23110

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### ● Paris Senior Programmer/Analyst c£8,500

Our client is an international firm of Chartered Accountants, who require a Senior Programmer/Analyst for their Paris office. He/she will work within the Computer Audit department alongside a small multinational team of accountants responsible for computer audit work throughout Holland, Belgium and France. The function of this additional team member will be to provide technical expertise and support in the running of computerised accounting systems. He/she must be able to work closely with both professional staff and clients in identifying problem areas within complex computerised accounting systems. Being the only DP professional in the team, he/she must be prepared to carry out varied tasks ranging from writing simple one-off programs designing large interrogation systems, and will also be expected to provide DP training and system control guidance to professional staff. Candidates for this position must have several years' experience using IBM COBOL under DOS and/or OS together with some involvement at a systems analysis level, preferably on accounting systems. Additional experience using other hardware and languages would be useful. Although fluent French is not essential initially, candidates should have a basic knowledge of the language and the ability to reach fluency quickly — they will be actively encouraged to do so. They must also be willing to undertake considerable travel within Europe. Ref: 445/CW/Sharon Matthews.

### ● Middle East

#### S. Systems Analysts — Kuwait £12,000+ tax free Project Leader — Tehran \$36,000

Large IBM 370 installations. Long term career positions and contracts. On-line systems — OS, IMS etc.

The KUWAIT client is a major trading company with sales of over £250m. New IBM hardware is being ordered (\$70/145 and larger) and an ambitious systems plan is being developed. Top rate Systems Analysts are needed to form the teams. Ideal candidates will be graduates with a sound record of achievements in their careers to date. They should have developed on-line accounting and inventory systems using large IBM computers. These are long term career appointments and there is a preference for married candidates, who would be expected to visit Kuwait before accepting a position. The remuneration package is exceptionally good and includes free accommodation and a car allowance. Ref: 721/CW/Neville John.

The TEHRAN vacancy is with an established consultancy and offers a contract of 1 year (renewable). The Project Leader will be responsible for a small team which will develop a large personnel data base system, to be implemented on large IBM hardware. Candidates should have significant systems experience using large IBM hardware, and experience of IMS and personnel systems would be a distinct advantage. Two Systems Analysts are also required for the project at salaries of about \$30,000. Single candidates are preferred. Ref: 444/CW/Sharon Matthews.

To apply for any of the above positions or for further information, please telephone or write to the Consultant concerned on 01-242 9356. If it would be more convenient to telephone in the evening, the telephone numbers are:  
Neville John — Farnborough (Kent) (86) 52017. Roger Allington — Berkhamsted (04427) 2299.  
Rene Nute — 01-874 6372. Sharon Matthews — Billerica (02774) 22361.

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Computing  
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Association

### ● Scientific Oriented Programming £3,000-£6,000

The vacancies are based in Reading (Berks) with opportunities to work on site in the UK or overseas. Candidates must have a degree or equivalent qualification in Engineering or Mathematics as well as several years' systems and programming experience, preferably on ICL Hardware. All applicants must be well spoken and presentable with an awareness of a customer environment. Our clients are a Software House of international standing, offering first-class conditions and excellent prospects. Ref: 670/CW/Rene Nute.

### ● Holland

There are currently a number of opportunities in Holland, some of which would apply specifically to Dutch Nationals or Afrikaans speaking personnel where this would be more important than the actual type of computer experience. Opportunities for travel within Europe also exist with some of these appointments. Specific requirements include:

#### Communications Fls. 30-45,000+

Most of the projects are Mini based using DEC, Data General, Hewlett Packard or Computer Automation hardware and include total systems supplied on a Turnkey basis with both hardware and software maintenance after implementation. Application areas include Process/Industrial Control, Telex, Message and Packet Switching, F.E.P., Networks and On-Line/R.T. Commercial Systems. Programming experience is essential and for the more senior appointments Supervisory ability or Design and Implementation experience would be required. Ref: 390A/CW/Roger Allington.

#### Commercial Fls. 35-50,000+

In addition to the Mini based Commercial requirements, we also wish to recruit a SYSTEMS CONSULTANT with sound experience and knowledge of Inventory/Stock Control applications, preferably using IBM hardware. Specific responsibilities would include Analysis, Specification and Implementation. Ref: 390B/CW/Roger Allington.

#### Freelance Fls. 1,100-1,300 per week

Programmers and Analyst Programmers are required for 3 month+ contracts, primarily for IBM and Honeywell installations in both application and software areas. Data base or Data Communication experience and/or fluency in Dutch or Dutch Nationality would be of particular interest for some of these requirements. Ref: 390C/CW/Roger Allington.



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We need 20 people for 6—12 month assignments in the American Mid West with leading U.S. companies.  
We want Systems Analysts and Programmers with at least 4 years' experience. You must have IBM know how.  
Travel to and from the U.S. is free.  
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People without family ties are preferred.

Your first step to the golden West is to lift the phone, dial 021-643 4577 and talk to Roger Radford.

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Our client, a Blue Chip Company whose success in existing vacancies within the management services function can lead to more responsibility and opportunity, seek the following:

Seven Senior Systems Analysts	5-8.25K(TW1250)
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Each position is clearly defined into its own discipline.

Specialists in Manpower to the Engineering Industries

### DATA GENERAL NOVA 3D + RDOS

William Clowes & Sons (Beccles) Ltd. are installing a dual Data General Nova 3D computer system with 56MB disk, magnetic tape, and input/output and on-line VDU's. The system is to be used for processing and with some programming knowledge is required to develop and test applications using a Fortran based suite of programs under the RDOS operating system, to drive an Autographic plotter.

A computer person with at least 18 months solid programming experience and with some programming knowledge is required to develop and test applications using a Fortran based suite of programs under the RDOS operating system, to drive an Autographic plotter.

Salary and conditions of employment are commensurate with the experience of a large group of companies.

Applicants should in the first instance write to the Personnel Officer:  
**McCORQUODALE BOOKS LIMITED**  
88 East Hill, Colchester CO1 2DH  
Telephone 0206 62321

A member of the McCorquodale group of companies

## THE COMMISSION OF THE EUROPEAN COMMUNITIES

Joint Research Centre - Ispra Establishment (Italy)  
IS SEEKING for the Informatics Division:

REF. 538:

### A SCIENTIST with university degree or diploma in INFORMATICS.

He will be charged with the development of a **PACKET-SWITCHING NETWORK** interconnecting heterogeneous computers.

- (1) At least 3 years of professional experience in systems development, as well as a thorough knowledge of at least one assembler and one high-level programming language, are essential.
- (2) Experience in the implementation of **COMPUTER NETWORKS** or **TELEPROCESSING FUNCTIONS** in operating systems would be advantageous.
- (3) To carry out these duties, a satisfactory knowledge of English is necessary.

REF. 539:

### A SCIENTIST with university degree or diploma in ENGINEERING and/or COMPUTER SCIENCE.

He will be charged with:

- (1) the related information service, research activity on **PROGRAMMING** and **DOCUMENTATION TECHNIQUES** for application software;
- (2) representing the Program Library in European study groups.

A good **SCIENTIFIC BACKGROUND** in general, as well as knowledge of technical-scientific applications of computers and of **SOFTWARE PORTABILITY** and **DOCUMENTATION** problems, are essential. Experience in computerized information services would be advantageous.

To carry out these duties, a thorough knowledge of English is indispensable. A satisfactory knowledge of French and/or German is desirable.

Recruitment criteria, based on the staff regulations and salary scale applicable to temporary agents of the European Communities:

Temporary contract, up to five years, with possibility of renewal - Salary according to age, qualifications and experience.

Other benefits include family and expatriation allowances.

Only nationals of the Community Member States may be considered for the above posts.

Applications, **WHICH MUST CLEARLY SPECIFY THE REFERENCE OF THE POST APPLIED FOR**, should be sent to the following address, together with a detailed curriculum vitae and copy of degree or diploma:

JOINT RESEARCH CENTRE, Administration and Personnel Division, I-21020 ISPRA (VA), Italy  
**WITHIN ONE MONTH OF PUBLICATION**

The candidates are requested to apply separately for each post they may intend to compete for.

### A UNIQUE OPPORTUNITY IN THE MIDLANDS

To join a dynamic company marketing DEC and other minicomputers on a turnkey basis.

We seek to recruit an Analyst / Programmer with at least 4 years' experience in commercial applications. Experience of, or enthusiasm for, pre-sales work will be an advantage.

Salary £5-6 + car + benefits.

Please write with details to:  
Andrew Reeves, Managing Director  
CBS CONSULTANTS  
111 Iskneld Street, Birmingham B15 6RZ

### Computer Operations Manager

£5,797-£6,382 p.a. inclusive

The Polytechnic's new DEC System 10/80 is scheduled to go operational shortly. Based initially at Hendon, the Operations Manager will join a senior management team and will be responsible for the efficient running and development of an extremely powerful, technically complex and geographically extensive computer network. He or she will be responsible for assessing the impact of new developments and for adjusting operating system parameters dynamically to cope with a continuously varying workload.

The postholder should be of graduate calibre, have not less than 10 years' experience of computer operations, and preferably have some experience in an educational environment. Evidence of ability to deal firmly yet sympathetically with personnel management problems is necessary, together with the ability to work under pressure, to take the initiative, and to act responsibly.

Please write for full details and an application form, bearing in mind, class: 10: Appointments Officer, (Ref: 50 95), Midlands: Polytechnic, Bouda Green Road N11 2ND, to whom completed forms must be returned by 19th September.

Middlesex Polytechnic

### REAL TIME MINI DOES YOU GOOD (Like anything up to £8,000 — plus)

Anything you've ever been up to with Real Time Mini could get you up to something even better this autumn. And no hanging about.

Because, if you've had any Real Time Mini experience at all — be it programming or S.A. — around at our place you're a wanted man or woman.

(Naturally, mind, the more you've had, the more you're wanted — and the more you'll get.)

You can go pretty well anywhere you like, too. London, Home Counties or Provinces.

And to whatever kind of company you'd like to work for. Manufacturer, consultancy or user.

Herewith, a few examples — just examples. Don't worry if what you want isn't here in this advertisement. You'll find a lot more where these came from — upstairs at Real Time Mini's place.

If you have experience on any type of mini computer, DEC, Ferranti, DG Nova, SPC 16, ITT3200, etc., using an assembler language, and have experience in one or more of the following fields, we'd like to meet you.

Message Switching, Communications, Real Time Process Control, Radar Control, Flight Simulation, Word Processing, Micro Processing, Banking or Commercial.

Those with experience of Corel, RTL2 or DEC operating systems, would also be of particular interest to our many clients.

Phone 01-636 6073 or 01-323 2795. Ask for Beryl McLaren. Interview as soon as you can make it.

Real Time Mini's Place  
**jupiter**  
COMPUTER APPOINTMENTS  
79 Great Titchfield Street, London W1

## Programmer/ Documentation Analyst

c.£5,000+Mortgage subsidy

We are a large international merchant bank operating on 3 PDP 11/50's and 2 PDP 11/70's on a real time financial system.

We are seeking personnel with experience in BASIC or AIMS to join a team involved in the documentation and maintenance of existing programmes.

In addition to a good salary, we offer fringe benefits which include LV's of 50p per day, House mortgage assistance, contributory Pension Scheme and free Life Assurance cover.

Please write with career details, or telephone for an application form.

J. A. Newman, Assistant Staff Manager,  
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London EC3P 3DB

Telephone: 01-623 8000 Ext. 654

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### Scientific Programmer c. £4,500

A unique opportunity has arisen within a small research unit of this large international company for a scientific programmer to join the data processing team.

The successful applicant will be involved in statistical analysis, maintenance and enhancement of existing programming systems, use of data-base systems and the writing of general utility programmes.

Applicants for this post should enjoy a variety of work essentially without supervision, and have a good knowledge of at least one scientific

programming language, preferably Fortran. It is unlikely that this knowledge could be gained in less than eighteen months. Exposure to file-management, data-base or statistics would be an advantage.

Benefits include Christmas bonus, four weeks holiday, non-contributory life assurance, sickness and pension scheme.

Please write with brief career and personal details to: Jane Jones, Personnel Department, Mars Group, Services, 132-133 Feltham Road, Slough, Berkshire SL1 4PY. Tel: Slough 30721

**Mars**

### Borough Treasurer's Department Programmer

AP.2/3 £2829 to £3282 +  
£212 salary supplement +  
phase 2 supplement

The Council operate an ICL 1901A with tapes and discs. Candidates must be experienced in COBOL.

Assistance will be provided with removal expenses, and provision of housing accommodation, in approved cases.

Application forms and job descriptions available from the Personnel Officer, Town Clerk's Department, Municipal Offices, St. James Street, Aylesbury, Bucks. HP8 1PQ, to whom they should be returned not later than 22nd September 1977.

Interviewing of Senior Officers or Members of the Council will automatically disqualify.

Borough of  
**HYNDBURN**

### OXFORD POLYTECHNIC Computer Centre

#### Chief Programmer

(Salary in the range of £4239 to £4545 plus £312 and Phase 2 supplement).

An experienced programmer is required to take charge of the Polytechnic team of three programmers. Applicants should hold a degree or equivalent, and have good experience of GEORGE II and MAXIMOP. The Polytechnic has an ICL 1903T which is currently being enhanced.

Further particulars and application forms from:

The Administrator  
Oxford Polytechnic  
Oxford OX3 0SP

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### TECHNICAL MANAGER

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c. £5500

A Technical Manager is required by a computer service company with an established software product. This is a new position in an expanding organisation and offers the successful applicant the opportunity to move into a management position from a programming background.

The new Manager will take responsibility for the technical department, particularly for the redesign and continued enhancement of a sophisticated software package, written in BAL and FORTRAN. He/she will be capable of the planning and control of large projects and new systems development. Ideally you will be educated to degree standard, possibly with some knowledge of statistics; a sound experience of IBM software, preferably DOS or OS.

The Company, a subsidiary of a major brewing group, offers a good employment package, including 22 days' holiday and a newly established bonus scheme. Attractive offices are situated conveniently close to both Paddington and Central Line Stations.

Please telephone for a confidential discussion or write to:  
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01-353 5868

## Computer Professionals. You could be a teacher in a class of your own

(and help develop the forefront of training technology\*)

Now you have attained more than a degree of proficiency in your computer field, perhaps you'd like to diversify a little and teach others what you know about programming, operating or maintenance engineering.

If so, read on, because Control Data Institute — the educational service of Control Data Ltd., world leaders in all aspects of computer products, systems and services — are looking for people aged 24+ with at least 2 years' experience in the computer industry, to become Instructors.

You can earn up to £5,000 p.a. initially, with progression to higher scales.

We're specifically looking for the following:

### COMPUTER PROGRAMMING INSTRUCTORS

COBOL experience essential, plus IBM Assembler/ICL PLAN or other low level language. RPGII would be advantageous. Vacancies exist in London, Southampton and Manchester and you

should be prepared to work away from your home base occasionally.

### COMPUTER OPERATING INSTRUCTORS

IBM 360/370 system and/or ICL 1900 GEORGE 2 experience required, with GEORGE 3 experience an added advantage. This position is based in the North West with travel between Birmingham, Leeds and Manchester.

### COMPUTER MAINTENANCE ENGINEERING INSTRUCTORS

Sound experience in maintenance of peripheral equipment, ideally that of a major manufacturer. Based in London at Control Data Institute. If you have the aptitude and motivation to teach others, we can offer you generous ancillary benefits in addition to an attractive salary. PLUS the incentive of a challenging and ever-interesting career.

\*We are just now installing our multi-media individualised training system, and will shortly incorporate Computer Based Education techniques.



Phone Susan Robinson on 01-637 2171 for a personal details form, or send your brief C.V. to:

Tony Fairfoot  
Control Data Institute  
77 Walla Street  
London W1P 3RE

This anonymous software ad  
was written by someone who answered  
our earlier anonymous software ad.

Back in March, Brian Ashworth noticed an ad in Computer Weekly. Its headline said: "The Software Mystery Tour."

Intrigued, he read on.

He didn't learn much, other than that the Company was "highly successful and technically orientated" and that salaries could be in the range £7000-£8000. But the temptation to go along for an interview and find out what the jobs were and who the Company was proved irresistible.

He subsequently joined us.

A little later on, when we asked him what he thought about software work with us, this is what he said:

"I believe our department can offer potential staff a more complete spectrum of work than any other company. Mini computer, micro computer, application packages.

standard software, compilers, operating systems, techniques and specialisms. The disciplines involved in a large software department, the career development opportunities that are available, the potentiality for line management or remaining 'on the technical side'—all these contribute to a good career. If you add to this the fact that... (our Company name) is in the forefront of its own areas of development, then what more can any computer professional want?"

If you're a software professional, earning more than £4000, and you're as intrigued as Brian was, there's an easy way to find out more.

Just leave your name, address and 'phone number with Norman Brown on 01-437-9261 or write to him at Austin Knight Limited, 20, Soho Square, London W1A 1DS.

The Company will soon be in touch with you.

## Freelance Programmers

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We urgently require  
\*ICL 1900/2900 COBOL/PLAN  
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## Cobol Programmer

This is an opportunity to join a young team with exciting growth potential.

Having recently advertised for an analyst and a programmer, we find that our increased development plans necessitate the addition of another programmer to our team.

We are embarking on a major development phase to supply computing facilities to newly acquired companies in our group. Areas covered will range from order/invoicing, stock control, etc., to rather more esoteric applications such as a structural stress analysis and heat loss modelling.

Our equipment comprises one of the larger I.B.M. System 3/15D installations in the country, with a strong commitment to developing our 3270 T.P. network. We require a programmer with at least 18 months' experience, who has the ability and the ambition to widen his/her knowledge of computing and business in many diverse areas.

If you think you can play an important and contributory role in our development plans and want to be involved in a major development project in inception, write giving full details to:-

Personnel Manager

**KYLE STEWART**

Ardsial House, Empire Way  
Wombly, Midx. HA9 0NA

or telephone: P. Campbell 01-902 5321 ext. 22

## Real Time Software Designers

£4000-£5500

The posts are with a major communications company now developing a range of modern business communication products involving the application of mini computers to real time control. They are for programmers/designers with several years' experience in software design for mini computers. There are many interesting design problems to be solved which will provide a challenge to competent and experienced people.

Salaries are negotiable, attractive benefits, generous re-location to the Midlands. Career prospects are companywide.

Please write with full details. These will be forwarded direct to our client. Let us know any companies to whom your application should not be sent. Alternatively, you may telephone (01-629 1844 at any time) for more information and an application form. To: Clark ref. PY 7604.

**MSL Management Consultants**  
Management Selection Limited  
17 Stratton Street London W1X 8PP

**H.P.S.L. H.P.S.L. H.P.S.L.**

**FREELANCE PROGRAMMERS**  
IBM PL/1 OS  
IBM COBOL OS/VS2  
ICL PLAN

Urgently required for long contracts in the Midlands

Tel. Amersham (02403) 22201

**H.P.S.L. H.P.S.L. H.P.S.L.**

**COBOL CONTRACTS**  
IBM OR ICL

UK & EUROPE

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01-402 9355

**FREELANCE PROGRAMMERS**  
IBM and DG

COBOL; PL/1; BAL  
DOS/VS; CICS; or DL/1  
BELGIUM & MANCHESTER  
Ring 061-969 4615

## LIVERPOOL

SALARIES NEGOTIABLE AND HIGHLY COMPETITIVE

## MAJOR PROGRAMMING OPPORTUNITIES AT ALL LEVELS, ONE OF BRITAIN'S LARGEST FOOD GROUPS

Our clients are shortly to install new Honeywell hardware at their site in North Liverpool. The equipment will consist of a dual Honeywell 6805 system supporting approximately 44 Level 6 machines in locations throughout Great Britain. They are currently involved in development of sophisticated integrated systems using the latest Honeywell hardware and software including TDS and IDS. Our clients now require additional people to join their application project teams.

## DESIGNERS/PROGRAMMERS

A wide range of programming skills are required for this exciting project including Programmers (with 12 months' plus experience), Senior Programmers and Design/Programmers. Applicants should have experience of one or more of the following:

COBOL (Honeywell preferred)  
Assembler (Level 6)  
G. Map

The positions are based on the outskirts of Liverpool within easy access to coastal areas and the Lake District (relocation expenses will be paid where applicable). Initial interviews will be held in Manchester, Birmingham and London.

CONTACT: David Wade, 061-833 0876.

### SPECIALIST COMPUTER RECRUITMENT LTD.

**BIRMINGHAM 021-236 3781 FREEPOST**  
Freeport, Equity and Law House, 35-37 Great Charles Street Queensway, Birmingham B3 2BR

**MANCHESTER 061-833 0676 FREEPOST**  
Freeport, Corn Exchange Buildings, Corporation Street, Manchester M4 6BD

**LONDON 01-935 0671 FREEPOST 6**  
Freeport 6, 102 Blandford Street, London W1E 1JZ

Ref. No. 77/09/11



## COBOL OR PL/I

City or Essex

3 1/4% Mortgage  
Salary to £6,000

A major U.S. International Banking Corporation is seeking a variety of Analysts and Programmers with IBM OS or DOS backgrounds. Programmers should have not less than 2 years' solid COBOL or PL/I with sound JCL and Utilities experience.

Successful candidates are likely to demonstrate ability to develop programs and systems from a structural design approach. The ability to adapt to professional documentation standards is essential and any experience related to Banking will be considered advantageous.

In addition to a subsidised mortgage and above average starting salary our client offers numerous other worthwhile benefits including non-contributory pension and subsidised Restaurant facilities.

These positions will primarily appeal to applicants with long-term career objectives within a highly professional environment which offers technical and career advancement prospects beyond the limits of typical D.P. installations.

Ref: 40/1

## CONTRACT PERSONNEL

Overseas & U.K.

Weekly Rates to

Amsterdam  
Rotterdam  
Brussels  
Dusseldorf  
C. London  
N. London  
W. London  
Berkshire  
Hants

Mini Anal/Progs  
IMS/DB Progs & Analysis  
Message/Phone Switching Progs.  
Fortran/Assem Mini Progs.  
IBM 370/OS COBOL/PL1 Progs.  
IBM 370/DOS/OS COBOL, BAL  
PL/1, COBOL, BAL Anal/Progs.  
APL/PL1 COBOL Anal Progs.  
Mini, M-Frame Anal/Progs.

£360  
£360  
£325  
£400  
£220  
£180  
£180  
£180  
£140

Ref: 40/3

Telephone: 01-409 0468 until 7 pm



## IMS ANALYSTS & PROGRAMMERS

City & W. London

Salary to £7,500

An important client — leaders in IMS development are expanding several of their project teams in both the City and West London and require experienced Analysts and Programmers with implementation expertise involving IMS under O.S. and preferably knowledge of T.S.O. Preferred languages are Cobol, PL/I or Assembler and any background in Database as experienced programmers.

Exposure to other T.P. Monitors will be considered in lieu of IMS and training will be given where appropriate.

In addition to excellent starting salaries our client offers exceptional fringe benefits and the prospect of rapid advancement is a realistic probability within this very professional D.P. department.

Interviews will be held throughout September and successful candidates will be made offers of employment within 10 days of interview.

Ref: 40/2

## ANALYSTS & PROGRAMMERS

London and Overseas

Salary to £7,000+  
Per Diem Allowance

An established U.K. Software House with extensive overseas operations is planning a major expansion programme and requires a number of Systems Analysts at various levels as well as experienced Programmers.

Ideally candidates shall have solid IBM OS backgrounds and programmers will demonstrate experience in ANS COBOL (BAL would be an additional asset). In addition any experience within a Mini computer environment would be considered an advantage. In depth exposure to OS/JCL and Utilities is a prerequisite.

These positions will appeal to applicants free to travel extensively overseas and to a lesser degree in the U.K. Very generous allowances will be paid during such periods. These positions are permanent and pensionable and candidates seeking long term career advancement will find considerable scope and opportunity within this progressive company. Interviews will be held in London throughout September and offers will be made to successful candidates within 1 week of interview.

Ref: 40/4

Avon House, 360-366 Oxford Street, London W1N 9HA  
(Opposite Bond Street underground)  
Tel: 28800 ALPRESS LON



### Junior Programmers £2,500-£3,750

LONDON, HOME COUNTIES

Only one year's experience? Then you are in great demand. We have a large selection of first-rate companies who need people like you.  
CW 36/1 Annette

### Operators to Shift Leaders £2,000-£4,000 (incl.)

LONDON &amp; HOME COUNTIES

We have many vacancies covering all types of machines and locations. Some firms will train from one manufacturer to another. Remember these positions are for shift working only. Hurry whilst stocks last.  
CW 36/2 Annette

### Systems Consultants £6,000-£9,500

CENTRAL LONDON

Seven large well-established consultancies wish to recruit systems people with all-round experience on third generation equipment and the right personality to deal with clients who require a first rate service. Technical communications consultants are also required where in-depth implementation experience of IBM or ICL T/P message switching networks etc., are essential. Excellent fringe benefits and prospects.  
CW 36/3 Michael

### Mini Computer Programmers to £6,950

U.K.

Your experience is required now. A very large number of vacancies are registered where a knowledge of Assembler or communications experience is essential (VRC programmers would also be considered). Opportunities exist in S.W., N.W. or W. London, Surrey, Hertford and Manchester in this exciting and rewarding field. There has also been registered some overseas posts to people with 5 or more years in mini computers.  
CW 36/4 Michael

### Time Sharing Programmers to £6,000

C. LONDON

If you have had time sharing experience involving the use of FORTRAN, BASIC or ASSEMBLER, then we have four nationally known companies who would offer you an exciting job in pre- or post-sales support. Some offer generous bonus schemes.  
CW 36/5 Michael

### Successful Salesmen to £12K quota earnings

U.K.

We now have ten different firms for both hardware and systems only companies who are anxious to meet successful salesmen in this industry. They must have previous relevant small systems experience (some VRCs will be considered). All firms have bonus schemes and cars or car allowance. Most positions in S.E. England, but 2 in Midlands.  
CW 36/6 Michael

### Contract Programmers to £190 p.w.

U.K.

Immediate requirements for IBM COBOL under DOS or OS for C. London, PL/1, OS or CICS, POP/11 or good IMS for various locations for 3 months plus. Also IBM vacancies in GERMANY, FRANCE, BELGIUM & HOLLAND. Ask for the Contracts Officer on 01-995 2238.  
38/7 Michael

## Senior Systems Analyst

London, c. £6,500

This is a new position in the systems team of a major international oil services group. Projects to be tackled in the near future will be centred in accountancy areas, involving close liaison with senior operational staff in both France and the U.K., giving ample opportunity for creative flair.

## Operator

London, c. £4,500

The above company requires an operator with a sound knowledge of IBM equipment. The successful candidate will be aged 25 - 30 years.

with experience of operating with DOS/VS. A working knowledge of French is essential.  
Ref: 23059/CW.

M.E. Cayzer, please quote appropriate reference.

LONDON: 01-734 6852, Sutherland House, 5/6 Argyll Street, W1E 6EZ.

**Hoggett Bowers**  
Executive Selection Consultants  
BIRMINGHAM, GLASGOW, LONDON, MANCHESTER, NEWCASTLE and SHEFFIELD.

### Sheffield Division Rotherham Works

## Analyst Programmers

Applications are invited from candidates of either sex to be involved in all phases of the development and implementation of the following major applications:

### Production Planning and Control Systems

The systems provide assistance in order planning and stock control for a major manufacturing site.

Current work consists of several projects at various stages of development and includes both on-line and batch. The proportion of on-line work will increase over the next few years.

### Finance Standard Systems

The systems are being developed and implemented to serve the finance function across the Corporation. Database software is used, together with advance teleprocessing techniques.

Candidates should have a minimum of two years' experience in analysis/programming, ideally using ICL 1900, COBOL and GEORGE 3.

The Departments are located at Rotherham, convenient for Sheffield, Doncaster and Barnsley. The area is close to the Peak National Park, and there is a wide variety of sporting, social and cultural activities available.

Please forward details or apply for an application form (quoting reference 3) to:

Senior Officer,  
Management Training and Development,  
BRITISH STEEL CORPORATION,  
Sheffield Division, Rotherham Works,  
P.O. Box 80,  
Sheffield Road, Rotherham S60 1DW

## COMPUTER PROGRAMMERS

Two opportunities have arisen within our Data Processing Department.

Firstly we are seeking a programmer skilled in the use of COBOL to join our team working on a number of interesting projects. We are ICL 1900/2904 Users and have been operating our own on-line real time systems for a number of years.

The work is both interesting and challenging, coupled with the benefits of working for a large company. If this interests you, come and have a chat about salary and conditions.

The team also requires a suitable 'A' level person to train as a programmer.

Please contact, in both instances: the Assistant Staff Manager, Personnel Department, Telephone Leicester 61551 Ext. 110.

The British United  
Shoe Machinery  
Company Limited  
Leicester

## HERTS AND NORTH LONDON

PROGRAMMERS — £3,500/£6,000  
ANALYSTS — £4,000/£6,000

Haymarket Computing specialise in D.P. recruitment for the Herts/North London area and we are currently anxious to interview Programmers and Analysts on behalf of clients located in Enfield, Edmonton, Waltham Cross, Potters Bar, Stanmore and Welwyn Garden City.

Applicants will be invited to look through our client register which details the companies, positions, salaries, prospects, etc., so that we may jointly decide which vacancies best suit your requirements and experience.

For more information ring:  
HAYMARKET COMPUTING LTD.  
Tel. Cuffley (Herts.) 4130

## PROGRAMMER

The company is a small independent team creating high quality reference books. We are also leaders in microcomputers for book publishing.

We are looking for someone with approximately 2 years' experience in Assembler programming and microcomputers. We offer a good salary commensurate with experience, 4 weeks' annual holiday and plenty of opportunity for development.

Apply with full details and stating current salary to:  
B. D. Evans, Production Manager  
LAURENCE URGAND ASSOCIATES LTD.  
Market House, Market Square  
Aylesbury, Bucks.

## COMPUTER OPERATOR Feltham

Ready Mixed Concrete Limited is a major building company with a world-wide turnover of £600 million.

We now have a vacancy in our real estate and professional Computer Department for an Operator.

Our installation consists of a new 1900, 10 MT deck, 8 EDS 80, card and paper running under George II operating system. In addition, the mainframe is to be upgraded to 1977/early 1978. A bonus will be offered on completion of the project.

Applicants should have a minimum of 2 years' experience in Assembler programming and microcomputers. We offer a good salary commensurate with experience, 4 weeks' annual holiday and plenty of opportunity for development.

In addition to excellent salary and allowances, we can offer a comprehensive employment which includes a contributory Pension Scheme and Life Assurance.

Please telephone for details or apply to:  
Ann Mullane, Personnel Officer

Ready Mixed Concrete Limited  
RMC House  
High Street  
Feltham  
Middlesex  
Tel: 01-890 1315

# SOFTWARE DEVELOPMENT

## COMMUNICATIONS AND RT OPSYS

A world major in communications systems is to develop a new device capable of controlling very large networks. It is based on a large number of microprocessors intimately linked to provide very high levels of simultaneous processing. The new operating systems and communications control software must be made highly efficient by using the latest design concepts and programming techniques. At this early stage in the project life cycle principal programmers are required to lead sub-projects. They will make a major contribution to the shape of software developed and its success in the field.

## PRINCIPAL PROGRAMMER

c£6000

OPERATING SYSTEMS

KENT

A person with experience of RT operating systems in a mini or micro computer environment is required to lead the development of the systems supervisor software. He should have sound Assembler and high level language experience, also experience of time critical multi processing environments would be advantageous. He needs good design and programming skills and the determination to make a new product successful in operation.

RW 36/1

## PRINCIPAL PROGRAMMERS

c£6000

REAL TIME APPLICATIONS

KENT

A person with good experience of developing Real Time Systems is required to be responsible for the applications aspects of the system. A large number of tasks need to be performed simultaneously and in Real Time by this system. Experience with telephony, airborne systems, air traffic control, process control, etc would be extremely useful. You should be fluent in a high level language such as Coral, RTL 2, PL 1, and experienced with minis or micros.

RW 36/2

## PRINCIPAL PROGRAMMER

c£6000

VM SCHEDULER

KENT

A Team Leader is required to be responsible for the task scheduling and error recovery functions of the system. He should have good knowledge of Real Time software and experience in high and low level languages. He should have worked with minis or micros in a time critical environment. He will develop the software that controls the virtual machine environment for the applications.

RW 36/3

## THE FUTURE:

This project is scheduled to last for three years. Its success will enhance your reputation within a major software development group who have many advanced projects running in the UK. Your progression in this company will only be limited by your capability.

Male and female applicants will be welcomed.

**hutchinson-scoggins recruitment**  
10, Dover Street London W1X 3PH  
Telephone 01-499 4501

# IBM AND PDP BANKING SYSTEMS

## MAJOR US BANK

LONDON

UK AND OVERSEAS IMPLEMENTATIONS

FULL BANK BENEFITS INCLUDING MORTGAGE AND BONUS

With an asset of circa \$25 billion and operations on all five continents, our client is truly one of the world's leading banks. The London computer department plays an important role in the development of the bank's worldwide systems. Current plans include the complete re-write of London's branch banking systems and the development of an International Overseas Network. Consequently they wish to expand the department.

## PROJECT LEADER

NEG c£7500

+full benefits

A Project Leader has direct responsibility for the design and implementation of a total system. He is given the necessary authority to be accountable for successful implementation on time and within budget. He will actively participate in all phases of the project life cycle. This demands complete flexibility. Therefore candidates should be results oriented, versatile professionals who do not shun detail level tasks such as writing program specifications or coding, if conditions dictate. Candidates should have worked on IBM equipment (preferably OS COBOL) and have a good appreciation of the banking environment.

RW 36/4

## PROJECT LEADER

Neg c£7500

+full benefits

In addition to being able to accept the responsibilities outlined above, this person should be a strong, independent Team Leader, capable of handling overseas implementations. Although London based, a good deal of travel will be involved in the implementation phases. Experience of minis (pref PDP) and mainframes is required.

RW 36/5

## SENIOR PROG/ANALYST

Neg c£6500

+full benefits

This person should be young, intelligent and well educated, with aspirations to develop into a highly professional Project Leader. Preferably having OS COBOL experience, you should be thorough and demanding in your approach; an articulate and effective communicator seeking to work in a team where only the highest of standards are acceptable.

RW 36/6

Successful candidates will be joining a high calibre team of professionals. Projects are aimed at timescales of six months to one year and in general programming is undertaken by bought-in resources. Therefore supervisory capability is expected. In addition to good base salaries the bank offers an excellent benefits package including 3% mortgage and a meaningful bonus.

A FULL JOB SPECIFICATION IS AVAILABLE AT INTERVIEW

## ARAMCO

Astral Recruitment Associates

## EDP with ARAMCO £7,800-£12,000 (after tax)

The Arabian American Oil Company (ARAMCO) in Saudi Arabia seeks:

### Programmer/Analysts (Commercial)

with at least 'A' level education and a minimum of 3 years' PL/1, 360/370 with JCL, and IMS programming experience supported by a further qualification or membership of B.C.S. Ref: 6261/1/CW

### Technical Systems Programmers

with 360/370 experience and knowledge of the internals of the OS/VS systems programme and also MVS internals, generation, de-bugging and maintenance. An engineering or computer science degree would be helpful. Ref: 6261/2/CW

The EDP operation centres on dual 370/158 and 370/188 under MVS and existing applications include materials control, maintenance scheduling, finance, payroll, tax and benefits plans. A large scale IMS/VS personnel data base is also being developed.

Appointments are single-status based on one year renewable agreements. Bachelors have 30 days' paid leave at contract end; married men on single-status have 2 weeks' paid UK leave every 4 months with 25 days at contract end. Medical care is free, housing is air-conditioned and recreational facilities are excellent. There are no tax problems. You must hold a current UK driving licence.

Please WRITE, quoting the appropriate reference, for preliminary documentation or further details, to Richard Darvell, Astral Recruitment Associates, Astral House, 17-19 Maddox Street, London W1R 0EY.

Search, Selection, Recruitment Advertising



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CONTRACTS  
FOR MINI  
PEOPLE  
UK & EUROPE  
Recruitment and Selection  
Specialists  
037 5551 day, 445 046 eve

## PROGRAMMERS

Experienced minicomputer professionals required on our own applications.

Preferably with DEC experience. Contracts for at least 4 months. £150-£180 weekly. No Agencies. 01-398 7340.



## Senior Programmers and Programmers

**Salaries up to £5,200 p.a.**  
**Bexley's new installation creates interesting and rewarding opportunities**

The Bexley London Borough is looking for Senior Programmers and Programmers who would welcome the challenge and development potential of a new installation. Our client is soon to commence an extremely interesting phase of development by installing an IBM 370/138 under DOS/VS as their first in-house machine. They will be developing a wide range of application areas but primarily, they will be creating a database for their Central Accounting System. They now have vacancies for:

### Senior Programmers

With sound experience of IBM COBOL. If you have additional knowledge of CICS, DL1 and have worked in DOS/VS environment, then this would be of particular interest.

### Programmers

Who are competent in writing COBOL programs. If you have not worked in an IBM installation, this is an ideal chance to gain experience of another manufacturer's hardware. Salaries will be negotiable according to your experience and a generous range of benefits include up to 25 days holiday plus 7 statutory days, and relocation assistance where appropriate.

Find out more by contacting Marilyn Black, quoting reference No. 717.



John Goldsmith (Computer Recruitment) Limited  
16 Buckingham Palace Road, London SW1  
Tel: 01-828 5388

**JOHN GOLDSMITH** (Computer Recruitment) Ltd.

## MYRIAD APPOINTMENTS LIMITED

Computer Personnel Consultants

### SENIOR PROGRAMMING STAFF

#### MIDDLESEX

#### Large IBM Installation

A major manufacturing and distribution Company to the west of London is seeking senior programming staff to supplement an existing programming team. The Company has recently upgraded their hardware and is currently developing several new systems using the latest IBM software.

A Chief Programmer is required to manage the programming team. A proven track record; capable of scheduling work, meeting deadlines and ability to communicate with senior management is essential.

A Systems Programmer or experienced Assembler Programmer is required to eventually take full responsibility for systems software.

Salary for these positions will present no problems for the successful applicants and the benefits package is commensurate with that expected from a large international Company.

### COBOL PROGRAMMERS

#### New Department

#### C LONDON

£3800-£5500

Excellent opportunities have arisen for Programmers seeking a position within a new team in a professional environment.

The company, part of an international group, is a leader in its field. Successful applicants will be engaged on extensive development work on an on-line commercial project. Training will be given and those appointed will be encouraged to accept increasing responsibility and gain progression towards design and analysis in the future.

Candidates should be able to offer 1-4 years COBOL experience, as appointments will be made on a level appropriate to individual experience.

The company has a range of fringe benefits including four weeks annual holiday and flextime.

### SENIOR ANALYST/PROGRAMMER

3 years' experience

c £5500

#### LONDON

This position offers positive career prospects to a programmer or analyst/programmer seeking a greater challenge, more advanced technical experience and additional responsibility.

Having successfully computerised a number of accounting and management information systems, the Company is now developing a large on-line system to assist with the production and distribution of a wide range of its products. Working within a small specialist team the successful candidate will have the opportunity to broaden his/her experience on this unusual application using the latest techniques and equipment.

Applicants should have around three years' programming experience and be keen to participate in analysis activities involving considerable user contact.

This is a senior position within an expanding organisation where conditions of employment are excellent and accompanied by a range of fringe benefits.

### PROGRAMMER

#### S. E. LONDON

to £5,500

This is an interesting and challenging opportunity for an experienced programmer to join an active department with an enthusiastic approach to computing.

There will be an initial period, during which the person appointed will acquaint themselves with the installation and the company business. After this period they will be encouraged to work on their own initiative often unsupervised. They will become involved in all aspects of systems development and will be largely responsible for the smooth running of current live systems.

Candidates will be able to offer programming experience, preferably using COBOL, coupled with some exposure to basic systems analysis.

Please telephone for a confidential discussion or write to:  
30 Fleet Street London EC4A 3DF  
01-353 1551



## WE SEEK

**SYSTEMS AND PROGRAMMING PROFESSIONALS  
FOR EXPANDING AND PROGRESSIVE OPERATION**

**ANALYSTS, SENIOR ANALYSTS, PROGRAMMERS, SENIOR PROGRAMMERS**

### BACKGROUND

A record of continuous improvement is the keynote of this Group which has an unparalleled profit record spanning 40 years. Our Engineering and Production reputation is highly respected in the industry, and so, in recent years, is its practical application of computer systems. Existing systems, batch and T.P. based, include Engineering (DBOMP), RPS, Inventory Control, Finance and Parts.

### THE COMPUTER

We currently use a 370/146 (1 mb), using 3330 drives, VDUs and terminal printers are used throughout the Company. This is to be replaced in January, 1978, by a totally new configuration based on a 370/148 (2 mb).

### METHOD OF WORK

You will be a member of one of our key project teams developing and implementing systems for Production, Purchasing and Corporate Finance. All members of our project teams are encouraged to become involved with our user clients not only during requirements analysis but all stages of development.

### CAREER PATH

This is a solid career opportunity offering experience, and training where relevant, in a wide range of systems in a dynamic business environment. There are excellent promotion prospects.

### CANDIDATES

Applicants should have been involved in the successful implementation of at least one major project, ideally utilising one or more of the following:—

DL/1  
DBOMP  
CICS/VS  
ASSEMBLER  
PL/1

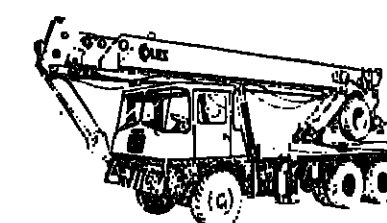
In the event that you have not been involved with any of the above yet have **SOUND ANALYSIS EXPERIENCE** or have programmed in **COBOL** we are still interested. Salaries are highly competitive, relocation expenses are available where applicable. Working location is in Sunderland, easily accessible from Durham, Newcastle, Chester-le-Street and Washington New Town. The area has some of the best countryside and coastline in England.

### APPLY NOW

by writing in sufficient detail as to make an application form unnecessary to—

PERSONNEL MANAGER  
COLES CRANES LTD.  
SUNDERLAND SR4 6TT

Or telephone Roy Smith (0783) 56281, extension 326, to discuss details and arrange an early interview.



## MANCHESTER

**OPERATIONS  
CO-ORDINATOR  
SALARY to £4,000**

We are retained by our clients, a well established and successful Computer Bureau, to recruit an operations professional. The ideal candidate should already hold a senior position within an operations department and have the ability to survive in a pressurised environment.

Experience in multi-programming and a knowledge of Honeywell equipment would be a distinct advantage but is not essential.

Candidates should have:

- \* a minimum of 4 years' experience in operations.
- \* proven experience in scheduling and control.
- \* the ability to streamline and enhance data control systems.
- \* the ability to liaise direct with users.

Our clients offer the successful applicant complete responsibility of the data control and data preparation areas of this expanding Bureau, and many opportunities for improving the existing department's efficiency.

Excellent terms of employment apply including 4 weeks' holiday, fringe benefits and relocation expenses where applicable.

CONTACT: Tony Deane, 061-833 0676. Ref. 77/09/12.

**ON-LINE CAREERS  
IN  
THE MIDLANDS  
to £4,800 p.a.**

A progressive career awaits you, working for a multi-million pound turnover group based in the Midlands.

Our client has an impressive data processing commitment involving extensive usage of on-line application development, based on ICL equipment.

Opportunities now exist for a

**SYSTEMS ANALYST/  
PROGRAMMER**

Candidates should have:

- \* Systems design or implementation experience coupled with a programming background.
- \* Experience of commercial applications, ideally in an ICL environment.
- \* Above all a true desire to progress and respond to the challenge of working in a professional and well managed environment.

Relocation expenses, excellent working conditions, low cost housing and other large company benefits including discount on company products, are offered to the successful candidate.

CONTACT: Cathy Tracey on 021-236 3781. Ref. 77/09/13.

**SPECIALIST COMPUTER RECRUITMENT LTD.**

**BIRMINGHAM 021-236 3781 FREEPOST**

Freepost, Equity and Law House, 35-37 Great Charles Street, Birmingham B3 2BR

**MANCHESTER 061-833 0676 FREEPOST**

Freepost, Corn Exchange Buildings, Corporation Street, Manchester M4 6BD

**LONDON 01-935 0671 FREEPOST**

Freepost, 102, Blandford Street, London W1E 1JZ



**SCR**



## NEW D.P. CONCEPT MAJOR U.K. GROUP MIDDLESEX

Our Clients are not only one of the largest and best known U.K. companies but have also become established as one of Britain's leading specialist organisations in the field of data communications. They have many years' experience in the supply of systems and equipment to provide more efficient and more cost effective teleprocessing.

They are about to introduce into the U.K. a revolutionary new D.P. concept in the field of communications and distributed intelligence. This product was recently announced in the U.S.A. where it had outstanding sales success largely due to:-

- \* Highly sophisticated and well proven software.
- \* Considerable investment in development.
- \* Excellent support and publicity back-up.
- \* A proven market place.

We have been retained to recruit key staff qualified to take part in the launching of this new product.

## SALES EXECUTIVES AND PRODUCT MANAGER

Earnings £10-12K + Car + Benefits

High calibre sales executives are required to form a new team to develop this market. The following experience is required:-

- \* 3-5 years' experience of selling computer products with a major computer/terminal manufacturer.
- \* Experience in teleprocessing.
- \* Ambitious and self-motivating.
- \* Experience of IBM hardware/software is highly desirable.

The Product Manager should have similar experience to that of the Sales Executives but in addition, will also have the ability to support customers in the implementation of their systems. The successful candidate will be expected to travel extensively, both in the U.K. and Europe. In this case, 3-5 years' experience with IBM hardware/software is essential.

## SENIOR SYSTEMS SERVICE ENGINEER

Salary £5,500 + Car + Benefits

Our Clients also require an experienced Systems Service Engineer to lead a team responsible for the installation of the first systems shipped and also to set up his own service department.

He will need to formulate a training plan for this department as well as providing normal service requirements. He will also support the sales division at marketing demonstrations. The successful candidate will be expected to undergo a number of weeks' training in the U.S.A. Experience in servicing IBM compatible hardware will be a great advantage.

Please contact the Advising Consultant quoting the appropriate reference number for further information regarding these excellent opportunities.

Ref: CW/19

HUTTON EXECUTIVE SELECTION LTD.  
HUTTON HOUSE  
HUTTON STREET, LONDON EC4A 3HR  
01-353 6187 (Office Hours)  
01-353 1436 (Answerphone Service)

# Hutton

### TECHNICAL POLYTECHNIC COMPUTER CENTRE PROGRAMMER ANALYSTS (4 POSTS) T1/5

Applications are invited for the above posts.

The Computer Centre provides a service to the whole Polytechnic and is planning to install a large modern computer in the near future. A wide range of programming is undertaken, including systems programming and the development of applications software for the academic departments, the Library and the Administration.

Programmer Analysts should normally be graduates or equivalent educational standard and preferably have two years' programming experience.

The starting salary will be at an appropriate point on the scale T1/5 £1,608-£4,816 (includes supplementary - minimum starting salary at age 21 - £2,382). A progressive career structure operates within the scale. For graduate the minimum scale will be T2 £2,993-£3,323.

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The Department operates an IBM 360/55 computer and makes use of the Rutherford Laboratory 360/195 for the computation and analysis of High Energy Physics data. An opportunity exists for a

### Young Physicist

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### Senior Systems Analyst £6,500

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Greenham (Plant Hire) Limited, a member of the Greenham Group of Companies, is currently upgrading computing power and now requires a Computer Operations Supervisor to be based in Stoke-on-Trent.

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Degree in Computer Science, or other equivalent professional qualification.

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Working language is English, however, some knowledge of French is considered an advantage.

Please write giving full career details to: Société Internationale de Télécommunications Aéronautiques, 112, avenue Charles de Gaulle 92622 Neuilly-sur-Seine, France.

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Applicants should have a technical background in electronics, and an ability to report knowledgeably on developments in radio communications, public telecommunication switching and transmission, broadcasting, recording and associated topics.

The correspondent must be able to work quickly and accurately under pressure, as well as undertake longer term projects. The position involves some travel at home and abroad.

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Write, giving details of career to date, to: The Editor, Electronics Weekly, IPC Electrical-Electronics Press Ltd, Dorset House, Stamford Street, London SE1 9LU.

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Please ask the advertiser to send me further details of electronic engineering/real-time programming opportunities (delete as appropriate) and an application form. Applicants should indicate on a separate sheet any companies to which their name should not be sent.

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The successful candidate will have the opportunity of commercial involvement on both sales and business negotiations together with the technical development of projects, and travel in the UK is a possibility.

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For an informal discussion regarding this exciting career opportunity contact the Senior Consultant, quoting reference number: CW150.



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The Systems Operations Supervisor will have gained management experience of leading a team developing and implementing material control and net requirement planning systems. The ideal candidate will be able to lead from the front and be capable of liaising both with internal staff and external users. Educated to G.C.E. 'A' level standard the candidate should have at least six years experience of working with computers. Salary negotiable Circa £6,000.

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**ON-LINE TERMINAL PROGRAMMER.** c£4,500. 2 yrs. plus Assembler. Good knowledge of On-Line applications.

**PROGRAMMER.** c£4,000. At least 2 yrs. + Cobol or Cobol and Assembler. Although this company is situated in Coventry, it is easily accessible to the motorway with low cost housing nearby. Full relocation expenses paid to successful applicant.

## MANAGEMENT/SYSTEMS

**SYSTEMS AND PROGRAMMING MANAGER.** 7 yrs. + experience in ICL 1900 Hardware, including On-Line and Real Time systems. Area: East Midlands. Salary c£6K.

**CONSULTANT ANALYST/PROGRAMMERS.** Required by a leading Software house. 5 yrs. + in Programming and Systems. Area: Midlands. Salary c£6.5K.

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**COMPUTER MANAGER.** Conversant with ICL 2903 or IBM Systems 3. 5 yrs. + Systems and Programming Language RPG 2. Area: West Midlands. Salary c£5½K.

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**PROGRAMMER.** 1 year + experience Cobol. Area: Stoke-on-Trent. Salary c£3.5K.

**PROGRAMMER.** 2 yrs. + experience Cobol. Area: Burton-on-Trent. Salary to £4K.

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We have many more Computer Positions on our register at all levels. Our service is entirely free to applicants.

## BOOKS

### Computer science for programmers

The Theory of Computer Science (A Programming Approach) by J. M. Brady. 287 pp. £8.00 (£4.50 paperback). Chapman and Hall.

THIS book aims at introducing the main features of theoretical computer science without too much mathematical detail. It is divided into two parts.

Part One deals with the meta-theory, by which is meant results about computer science. Two models for computable functions are taken: Kleene's recursive functions (GRF) defined via schemes and Turing machines (GRF) defined via Turing machines. These classes are shown to be co-extensive by compiling GRF into Turing programs (thinking of this as the machine language) and conversely simulating Turing machines using GRF.

Several undecidable problems are given (of course including the halting problem). The section on formal languages contains some errors. Throughout Part One, the author tries to give as much motivation as possible (in contrast with many more mathematical texts).

Part Two is concerned with theoretical results in computer science. It begins with an account of McCarthy's work, where computable functions are defined using composition, conditionals and recursion. (If Kleene's First Recursion Theorem had been given in the meta-theory, it would then be immediate that nothing is being added to GRF by including recursion.) A discussion of recursion induction is given with several examples, but it is not made clear that only total functions are being considered.

Reliability of programs is next considered. This is a good brief account of program proving, based mainly on Floyd, Hoare and Manna's work. The final chapter is on the meaning of

programs and describes the operational and mathematical (in the sense of Scott and Strachey) semantics. The latter is somewhat sketchy as the author wishes to avoid going into details of Scott's models.

The style is easy to read, but the persistent use of "checkpoint" I found somewhat irritating. The choice of BCPL for writing many of the programs seemed a bit odd, especially as it was then necessary to add an appendix on the language.

The results in this book should be known by the average programmer. (Witness the remark of the author when discussing the halting problem, "I am aware of a computer manufacturer who, in the past decade, attempted to build such a program".) The fact that there is not too much mathematics (together with the reasonable paperback price of £4.50) might make it attractive to them.

PHIL GRANT

### The world of calamities

Computer Security and Protection Structures, by Bruce J. Walker and Ian F. Blake. 142pp. £11.20. Dowden, Hutchinson and Ross Inc. (Distributors: John Wiley.)

There is nothing quite like curling up with a good computer security book for despatching complacency, and this book is no exception. From page one, it plunges into the unfamiliar world of Disasters - natural or otherwise. Calamities and Threats compete for the attention of the reader.

As the book, perhaps rather worryingly, states, natural calamities which could occur to computing centres include earthquakes, tornadoes, aircraft crashes, lightning and war. All have one factor in common. They are very destructive and expensive. Not surprisingly, the book is

short on precautionary advice on this front. The book does include, however, such everyday hazards as the overhead electric light bulb which caused the complete destruction of a Pentagon data centre.

Computer security books, as a rule, arrive in two categories. There is the down-to-earth, practical variety, which concentrates on shutting and bolting the installation security door before it is too late. The other is the type which concentrates on methods of evaluating risk - when it could well be too late.

This publication ignores the evaluation exercise, concentrating more on physical safeguarding of computer systems. Particularly thorough is the emphasis on security software systems and terminals. Program and operating protection methods are

fully described. The book includes useful surveys of implemented protection systems.

The book does seem to have suffered some degree of time-lag in preparation. The copious references, for example, are limited to the period 1949-1974. Much has happened to security techniques in the past few years - access cards, for instance, have become highly sophisticated. Privacy has become a burning topic - it is hardly mentioned in the book. Personnel and insurance fare little better, both limited to brief paragraphs. This hardly does justice to their relative importance in DP security terms.

While perhaps the book fails to meet the needs of the everyday DP manager, it could well benefit the programmer, reference librarian and systems analyst.

FOCUS

### Micro systems design

Microprocessor Systems Design, by Edwin E. Klingman. 480 pp. £15.80. Prentice Hall.

THIS book provides extensive coverage of the subject, starting from single AND and OR gates and indicating how circuits are built up from these simple gates. Successively more complex building blocks are developed until ultimately a microprocessor is described.

The Intel 8088 microprocessor is covered in some detail and examples of interfacing memory and I/O devices to this processor are described to illustrate the principles involved in the design of microprocessor systems.

Subsequent chapters deal with addressing structures, I/O structures and techniques, internal structures, and DMA structures and techniques describe the available facilities which are usually Intel 8080 and how they can be used. The author

then indicates how the facilities provided by a range of other microprocessors differ from these.

The final chapter, on microprocessor architecture, describes some special-purpose processors and programmable I/O chips and USARTS, and briefly describes multiprocessor systems with particular reference to the National Semiconductor SC/MP. The book is up to date with descriptions of the most recent Intel microprocessors (8085 and 8088).

Although hardware design techniques are covered in some detail, very little is said concerning the design of the software (which is an increasingly important part of the total system design, as hardware costs fall, interfaces are simplified and applications become complex).

The section on languages and language translation describes an assembly language without embellishing

that it is only suitable for the 8080 and - that the facilities available with other microprocessors may differ considerably. Higher level languages are barely mentioned and relocation and linking of program modules are ignored.

Titles of sections are sometimes misleading, thus the six-page section entitled "Conditional assembly" contains one paragraph relating to conditional assembly facilities and 5½ pages developing an example program which does not include this feature. The single paragraph does not include a reference to the appendix, which does give an example of conditional assembly.

The book provides a useful comparison of a wide range of microprocessors and describes how other components may be interfaced to them. It may be recommended for this in spite of its deficiencies on the software side.

H.M. WALL

### Useful guide for the business student

Data processing for business (2nd edition), by Gerald A. Silver and Joan B. Silver. 686 pp. Paperback £7.05. Harcourt Brace Jovanovich International.

THIS new edition of the textbook is intended to update it with the developments which have occurred since the first edition was published in 1973. The new sections designed to cover these developments comprise a discussion of hardware trends and the use of Basic.

The book is apparently intended for use at a graduate business school as the course textbook on an introduction to data processing. It would be more successful in this if it concentrated more on the new techniques which management needs for the future and less on what has been achieved in the past.

The crisp, factual style of writing condenses a large amount of information into the volume with relatively little discussion.

The various exercises show considerable imagination and allow the student ample scope for independent investigation.

It is a tradition in textbooks that the larger part of the book outlines detail at the lowest level; uses programming illustrations for the simplest possible problems; and then concludes by briefly describing in outline the most complex systems which have yet been devised, without any indication of the manner of solving the problems involved. This book is no exception. The few paragraphs on analytical methods reveal a simplicity of approach that would overlook many of the practical problems.

A useful guide for the business student, but not much help to the data processing practitioner.

J.W. MITCHELL

### Microcomputer engineering

Microcomputer-based design, by John E. Peatman. 540 pp. £15.75. McGraw-Hill.

THE aspiring microcomputer engineer must at some time or other need an instant reference book covering most aspects of MPU design, from chip level to system design, between one set of covers. Here it is. Although Professor Peatman has aimed for the engineer, the book will also appeal to those connected with the managing or selling of MPU hardware.

By the time any book on MPUs is written and published, it has already become dated and a good feature of the book is that information on specific machines is kept to appendices. However, the book is not product biased, rather it

covers design rules applicable to any development work and it succeeds rather well in this.

The work is in seven sections: the role of the microprocessor; microcomputer registers and data manipulation; microcomputer hardware; memory; input/output; hardware and software development; algorithmic processes.

The completeness here does not bypass thoroughness, and it is refreshing to find that Professor Peatman has used a "begin at square one" approach.

The book contains many illustrations which will irritate those of literary bent. However, the writer noticed the English translation of "Anquidator" in brackets as if to half-apologise for those abhorrent words (it is, of course,

### Breaking down jargon barrier

Science Fact, edited by Prof Frank George. 540pp. £1.50. Topaz Books, Gt Missenden, Bucks.

ANY book that can discuss the latest scientific developments without the reader having to resort to a dictionary every few pages would make an important contribution to the breaking down of the "jargon barrier" that seems to exist when technical events need to be communicated.

This is such a book.

This 540-page survey by experts in a cross-section of fields has a "new" feel to it. It does not rely on giving new angles to old information, but uses the latest developments, backed up by historical data, as a platform from which ordinary people can look over the fence at what is happening in this normally out of bounds area.

The editor of the book is Frank George, Professor of Cybernetics at Brunel University, who has acted as an advisor to NATO, the Ministry of Defence, and other organisations.

First of the contributors is Dr Chris Evans, the psychologist and computer scientist, who writes under

the heading "Computers and Artificial Intelligence". Here we meet the Ultra Intelligent Machine (UIM) as first described by Professor I. J. Good, the mathematician and philosopher. Evans indicates how, if UIMs are given sufficient programming initially, they can take it from there to become masters of their own evolution.

... Man is about to create a new companion for himself on his native planet, a companion who will rival and vie with him for natural resources, but for intellectual supremacy," he says.

Examples of other general topics include automated factories, a shorter working week, Electronic Funds Transfer Systems, dental decay prevention by injection, growth of microprocessor usage, trends in food and other resources, and the delegation of key decisions to what will be the new breed of machines, and the "probable impossibility of reversing those decisions."

The other contributors cover, in turn: electronics (Brian Jennings); medicine and surgery; to 2001 (John Nevell); genetic engineer-

As can be seen, Science Fact takes a big bite out of science and technology, and there is some overlap of subjects, but Professor George has added a further chapter of some importance, making this a thought-provoking work. Thought provoking enough for the publishers to announce in a postscript that it is to be followed up by another book called "Life-style for Survival".

This will take the logical conclusions of Science Fact and present them to eminent individuals in religious, scientific, political and economic circles.

ROBIN WEBSTER

### Product planning

Product Planning, 2nd edition, edited by A. Edward Spitz. 412 pp. £8.25. Petrolcelli/Charter, available in the UK from Input Two-Nine Ltd.

THIS book is a collection of 40 articles from 18 publications; just over half the articles are from the Journal of Marketing, Business Topics and Research Management. Most date from 1972-75.

The skillful selection covers major aspects in moderate depth with little overlap. The orientation is mainly toward consumer products, but enough is said of industrial products to make this useful reading for product planners and senior managers in the computer industry, increasingly some of us will be concerned with computers in consumer goods.

The viewpoint is almost entirely American, with no mention of exports. There are plenty of references throughout the book, but the index is perfunctory. Each section ends with a set of questions for discussion.

A 10% sample indicates the scope of the work:

Do charismatic employees indicate eventual trouble for a firm?

Why is innovation necessary for firms? Do we have too much material wealth?

Is the venture approach more conducive to success in introducing new products than the product manager approach?

What methods can you use to rate a company's research productivity?

Discuss the meaning of analogue and iconic models.

Give an example of each.

What does commercialisation of a product mean for a firm? In effect, what decisions are made?

Do products actually have life cycles?

What are the primary causes of failure in products?

What remedies are available to individuals who have their inventions stolen?

Do you believe that some business organisations abide by a code of ethics? Can you name any?

Discuss planned obsolescence, its pros and cons.

How do you feel about the federal government's role as seller of product services?

For answers to these and many more, read the book. Not that ready-made answers are provided, but a basis for formulating views is there.

ALAN SUTCLIFFE

### Puzzle answer

To enclose the maximum floor space, each partition must be placed so that it forms the base of an isosceles triangle, the other two sides being (a) the adjacent wall and (b) an imaginary line bisecting the corner.

The optimum area is in fact one-quarter of a regular octagon, centred on the corner, which makes the "interior angle" 135°.

Several readers have sent in alternative layouts which "solve" this playing-card problem (CW July 14), as follows: Sandra Cox, UK; GJ, UK; DO, UK; JA, UK; BJ, UK; DO, UK.

ROBIN HEATE

## IMPORTANT REMINDER

Make sure you don't miss our issue of September 22nd, which will highlight the opportunities currently available in Wales and the West Country. To advertise in this important feature contact:

Alan Escott on 021-356 4836  
or  
Mark Williams on 01-261 8019

## CONTRACT EUROPE

- High income contracts through R.T.Z. Computer Services/Informatica - The Park based European systems house.
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Two additional staff are required to work on a 2-shift, 5-day week system. Salaries are inclusive of shift allowances and there are attractive fringe benefits, including LV's and an annual bonus.

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Application forms, which should be returned by Friday, 23 September, are available with further particulars from Miss Jane Taylor, Personnel Office, University of London, School Examinations Department, 68-72 Gower Street, London, WC1E 6BT. Tel: 01-275 3000.

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## UNIVERSITY OF OXFORD Appointment of a Computer Programmer

Applications are invited to fill a vacancy in the Department of Management Services Section of the University Office of Management Studies. The successful candidate will be responsible for designing and implementing an interesting range of personal record applications in the field of university administration.

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Further particulars may be obtained from Mr. David Lloyd (Administration), University Office, Wellington Square, Oxford OX1 2JD to whom applications should be sent by 18th September.

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